



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

### Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

### About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

HOPKINS & UNDERWOOD'S  
NEW ARITHMETIC

FIRST BOOK

UC-NRLF



\$B 306 385

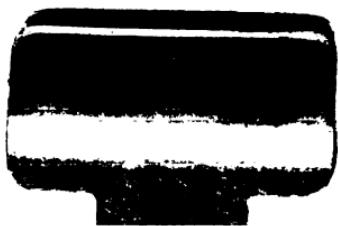
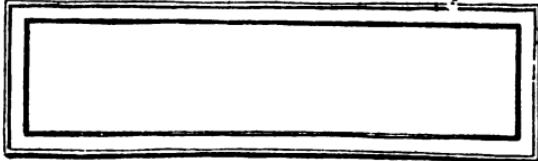


THE MACMILLAN COMPANY

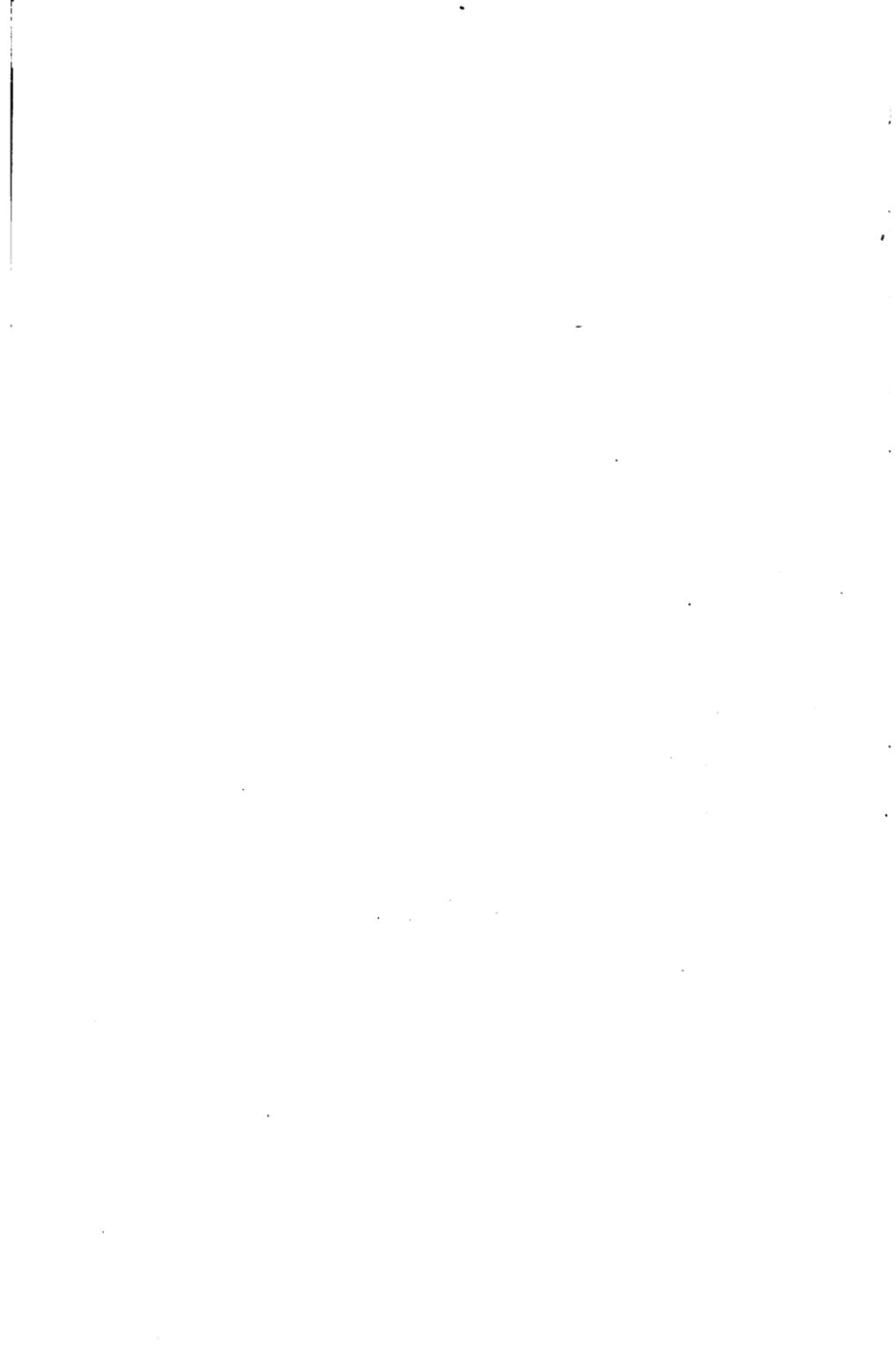
UNIVERSITY OF CALIFORNIA

DEPT

No. 274







# **FIRST BOOK IN ARITHMETIC**



**THE MACMILLAN COMPANY**

NEW YORK • BOSTON • CHICAGO  
ATLANTA • SAN FRANCISCO

**MACMILLAN & CO., LIMITED**

LONDON • BOMBAY • CALCUTTA  
MELBOURNE

**THE MACMILLAN CO. OF CANADA, LTD.**  
TORONTO

HOPKINS AND UNDERWOOD'S *OF*  
CALIFORNIA  
NEW ARITHMETICS

FIRST BOOK

BY

JOHN W. HOPKINS

SUPERINTENDENT OF THE GALVESTON PUBLIC SCHOOLS

AND

P. H. UNDERWOOD

TEACHER OF MATHEMATICS, BALL HIGH SCHOOL, GALVESTON, TEXAS

New York  
THE MACMILLAN COMPANY  
LONDON: MACMILLAN & CO., LTD.

1907

*All rights reserved*

TO MIND  
AMERICANA

CLARK  
HIS  
WORLD

COPYRIGHT, 1908, 1907,  
BY THE MACMILLAN COMPANY.

Set up and electrotyped. Published September, 1903. Reprinted  
November, 1903.

New edition, September, 1907.

EDUCATION DEPT.

Norwood Press  
J. S. Cushing Co. — Berwick & Smith Co.  
Norwood, Mass., U.S.A.

## PREFACE

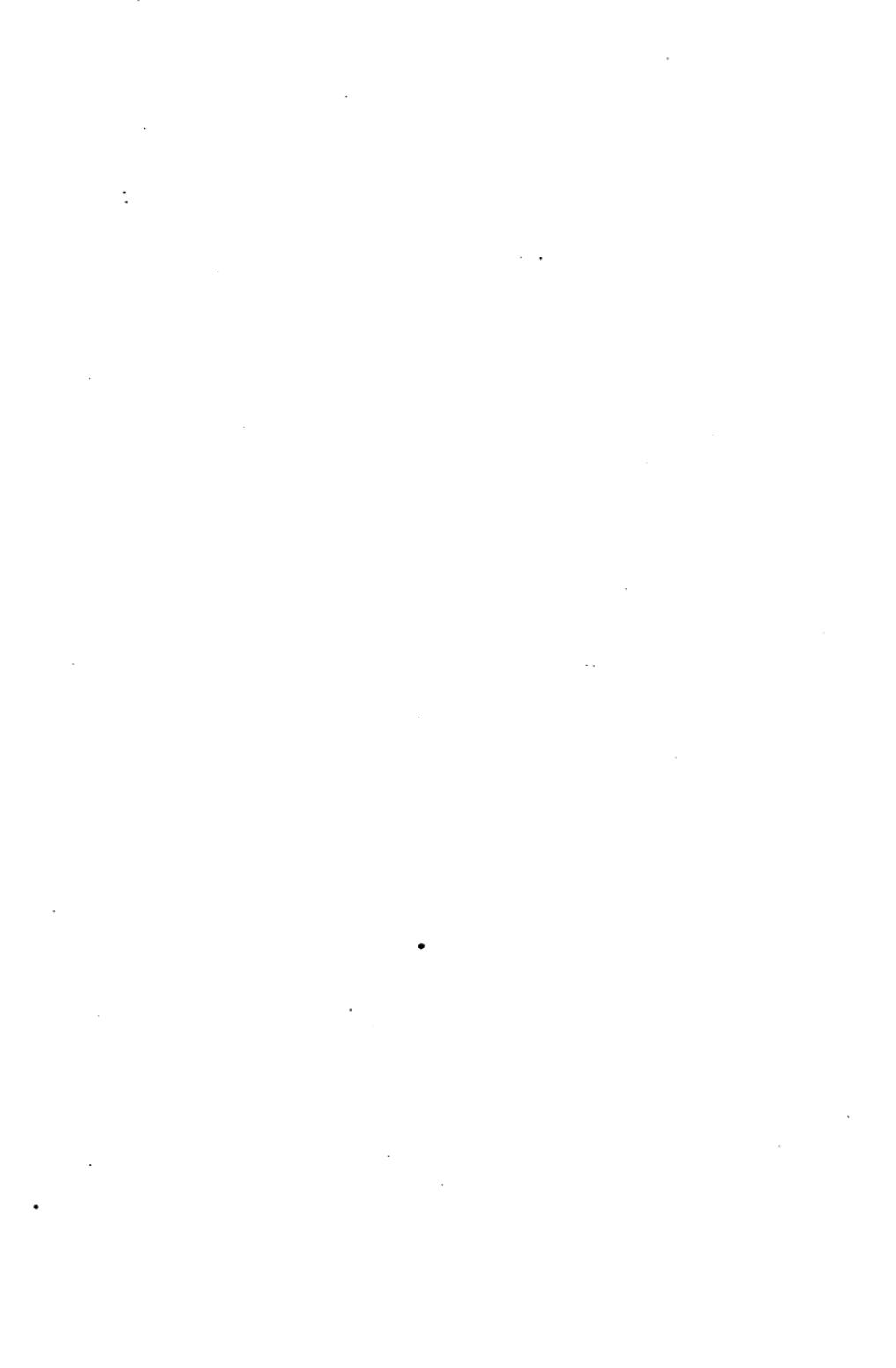
THE Beginners' Book is intended for the second, third, and fourth years of school. During the first year of school, an arithmetical text should not be used by the pupil. Part I furnishes an abundance of material for one year's work. Part II deals with the four fundamental rules applied to integers and to United States Money. Part III deals with Fractions, Decimals, Compound Quantities, and Percentage. The subject of Decimals is early introduced, as it should be, thus affording a review of the fundamental operations and at the same time an insight into practical computation. In writing this book it has not been forgotten that arithmetic is an art, and that for beginners the most essential thing is practice in the art of numbers. A characteristic feature of the book is that the examples, with very few exceptions, involve only one of the fundamental processes. Beginners do not possess the ability to follow a chain of reasoning, but they readily acquire new facts and ideas. Therefore the explanations of processes are brief and are illustrated so that there may be a visual basis of comprehension.

THE AUTHORS.

GALVESTON, TEXAS,

June 21, 1907.

541421



## CONTENTS

### PART I

#### INTRODUCTION

	PAGE
Numeration and Notation of Numbers to 12 . . . . .	1
Counting the Marks for Inches on a Foot Rule . . . . .	1
Counting Objects . . . . .	3
Addition of Numbers whose Sum is less than 12 . . . . .	5
Subtraction of Numbers Less than 10 . . . . .	6
Counting by Twos and Threes to 10 . . . . .	8
Notions of Multiplication and Division . . . . .	10
Written Exercises in Addition and Subtraction . . . . .	11
Numeration and Notation of Numbers from 10 to 20 . . . . .	13
Exercises in Addition . . . . .	16
Simple Concrete Problems . . . . .	17
Notions of Multiplication and Division . . . . .	24
Counting by Twos, Threes, Fours, and Fives . . . . .	25
One Half, One Third, and One Fourth . . . . .	25
Simple Concrete Problems . . . . .	28
Pint, Quart, and Gallon. Simple Problems . . . . .	30
Numeration and Notation of Numbers from 20 to 30 . . . . .	34
Addition Table . . . . .	35
Counting to 30 by Twos, Threes, etc. . . . .	37
Thirds and Fourths of Numbers Illustrated . . . . .	43
Time on the Clock. Roman Notation . . . . .	45
Days and Months. Simple Problems . . . . .	46
Numbers from 10 to 100 Illustrated . . . . .	48
Numeration and Notation of Numbers to 100 . . . . .	49
Counting Money. Simple Problems . . . . .	51
Counting between 30 and 40 . . . . .	53
Simple Concrete Problems . . . . .	54
Bushels, Pecks, Quarts, and Pints. Simple Problems . . . . .	57
Notions of Multiplication and Division . . . . .	60
Yards, Feet, and Inches. Problems . . . . .	61

	PAGE
Counting between 40 and 50 . . . . .	62
Pounds and Ounces. Problems . . . . .	64
Dollars and Cents. Problems . . . . .	65
Counting to 100 . . . . .	66
Subtracting Numbers less than 10 from Numbers between 10 and 100 . . . . .	68
Counting by Twos, Threes, Fours, etc., to 100 . . . . .	69
Multiplication Table . . . . .	70
The Triangle, the Square, the Rectangle. Problems . . . . .	71

## PART II

Addition Illustrated . . . . .	73
Exercises in Addition of Numbers of Two Figures . . . . .	74
Numeration and Notation of Numbers to 10,000 . . . . .	77
Counting by Twenties, Twenty-fives, Thirties, Fifties, Hundreds, Two Hundreds, etc. . . . .	81
Addition of Numbers of Three Figures . . . . .	82
Rectangle, Square. Problems involving the Fractions Halves, Thirds, Fourths, Fifths, Sixths, and Tenths . . . . .	87
Review . . . . .	90
Roman Notation . . . . .	93
Numeration and Notation of Numbers to Millions . . . . .	94
Addition . . . . .	97
Subtraction . . . . .	100
Multiplication . . . . .	107
Multiplication Table . . . . .	114
Division . . . . .	114
Long Division . . . . .	119
Short Method of dividing by 100 . . . . .	124
Short Method of dividing by 1000 . . . . .	125
United States Money . . . . .	126
Reduction of United States Money . . . . .	128
Addition of United States Money . . . . .	130
Subtraction of United States Money . . . . .	135
Multiplication of United States Money . . . . .	139
Division of United States Money . . . . .	146
Review . . . . .	156

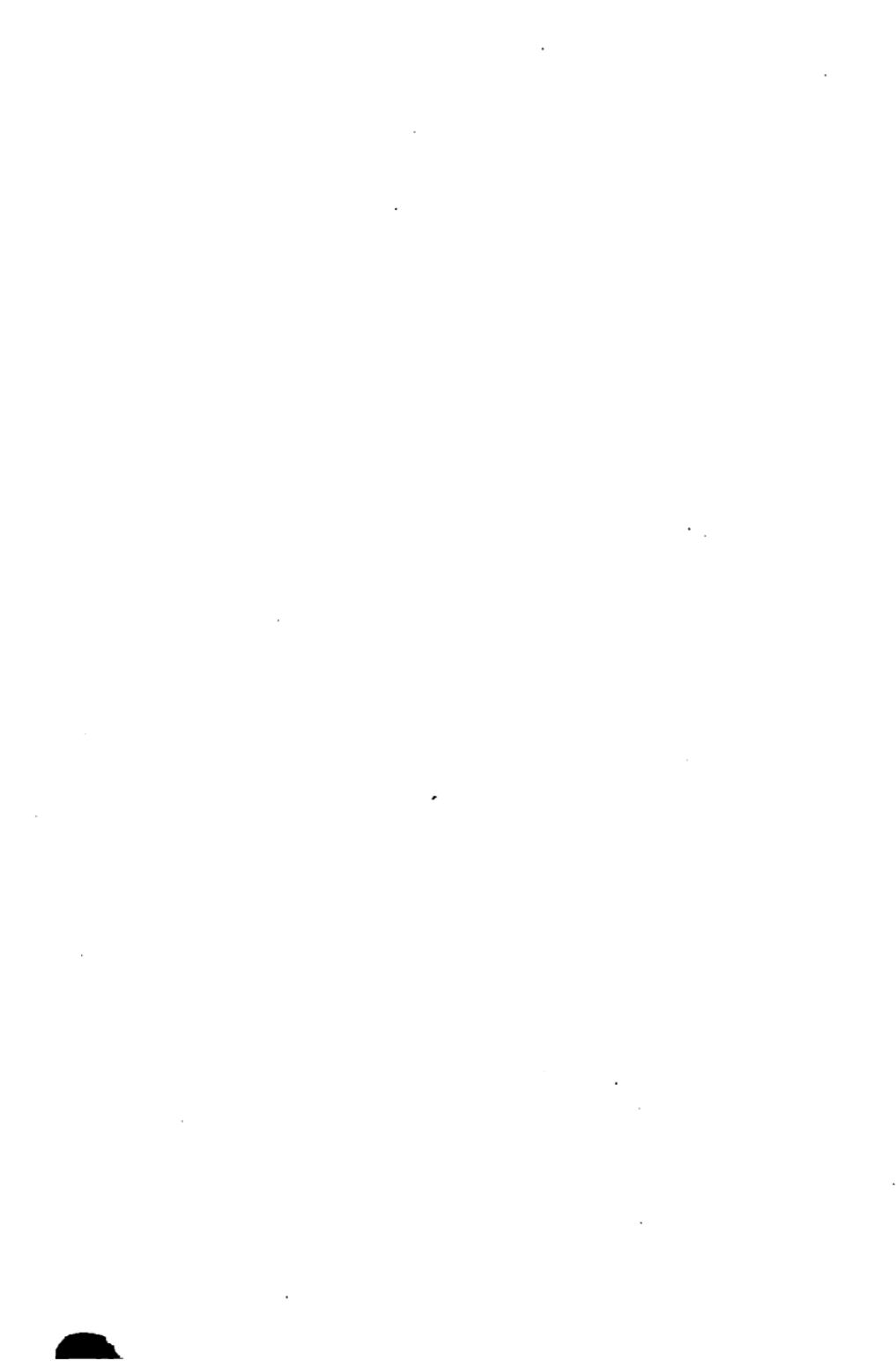
## CONTENTS

ix

	PAGE
Bills . . . . .	160
Miscellaneous Exercises. General Review . . . . .	163

## PART III

Factors . . . . .	168
Measures and Multiples . . . . .	169
Review . . . . .	171
Fractions . . . . .	174
Addition of Fractions . . . . .	187
Drawing Exercises . . . . .	193
Addition of Fractions with Different Denominators . . . . .	194
Subtraction of Fractions . . . . .	197
Multiplication of Fractions . . . . .	200
Analytical Work . . . . .	205
Division of Fractions . . . . .	206
Review of Fractions . . . . .	207
Relations of Numbers . . . . .	209
Ratio . . . . .	213
Decimals . . . . .	214
Addition of Decimals . . . . .	218
Subtraction of Decimals . . . . .	219
Multiplication of Decimals . . . . .	220
Division of Decimals . . . . .	223
Areas . . . . .	226
Linear Measure . . . . .	229
Square Measure . . . . .	230
Cubic Measure . . . . .	232
Time Measure . . . . .	234
Avoirdupois Weight . . . . .	237
United States Money . . . . .	238
Compound Quantities . . . . .	240
Addition of Compound Quantities . . . . .	240
Subtraction of Compound Quantities . . . . .	242
Multiplication of Compound Quantities . . . . .	243
Division of Compound Quantities . . . . .	244
Percentage . . . . .	245
Interest . . . . .	247
Tables . . . . .	249



# ARITHMETIC

## BEGINNERS' BOOK

### PART I

One	Two	Three	Four	Five	Six	Seven	Eight	Nine
1	2	3	4	5	6	7	8	9

Naught, zero, or cipher is written 0. Ten is written 10. Eleven is written 11. Twelve is written 12.

#### EXERCISE 1 (Oral)

Pupils should be provided with a foot rule on which inches are marked.

How many inches are :

1. 2 inches and 3 inches ? 2 inches and 4 inches ?
2. 2 inches and 7 inches ? 2 inches and 8 inches ?
3. 3 inches and 4 inches ? 3 inches and 5 inches ?
4. 4 inches and 3 inches ? 4 inches and 4 inches ?
5. 5 inches and 2 inches ? 5 inches and 3 inches ?
6. 2 inches and 3 inches ? 2 inches and 4 inches ?
7. 2 inches and 5 inches ? 2 inches and 6 inches ?
8. 2 inches and 7 inches ? 2 inches and 8 inches ?
9. 3 inches and 2 inches ? 3 inches and 3 inches ?
10. 3 inches and 4 inches ? 3 inches and 5 inches ?

2  
ARITHMÉTIC

EXERCISE 2 (Oral)

How many inches are :

1. 5 inches and 4 inches ? 5 inches and 5 inches ?
2. 6 inches and 1 inch ? 6 inches and 2 inches ?
3. 6 inches and 3 inches ? 6 inches and 4 inches ?
4. 7 inches and 1 inch ? 7 inches and 2 inches ?
5. 7 inches and 3 inches ? 8 inches and 1 inch ?
6. 8 inches and 2 inches ? 2 inches and 8 inches ?
7. 9 inches and 1 inch ? 1 inch and 9 inches ?
8. What mark on a foot rule is the same distance from either end ?
9. How many inches are four inches and seven inches ?
10. How many inches are seven inches and four inches ?
11. How many inches are five inches and six inches ?
12. How many inches are six inches and five inches ?
13. How many inches are eight inches and three inches ?
14. How many inches are three inches and eight inches ?
15. How many inches are nine inches and two inches ?
16. How many inches are six inches and six inches ?

**EXERCISE 3 (Oral)**

1. How many are two oranges and three oranges?
2. How many are three oranges and two oranges?
3. How many are two oranges and four oranges?
4. How many are four oranges and two oranges?
5. How many are three oranges and three oranges?
6. How many are four oranges and two oranges?
7. How many are five oranges and one orange?
8. How many are three pears and three pears?
9. How many are three pears and two pears?
10. How many are three pears and one pear?
11. How many are four pears and two pears?
12. How many are five pears and one pear?
13. Edward had six marbles and lost one. How many had he left?
14. Edward had six marbles and lost two. How many had he left?
15. James had six marbles and gave Edward three. How many did he keep?
16. Henry had four marbles and gave James one. How many did Henry then have?
17. Henry had four marbles and lost two. How many did he then have?
18. Mary bought three apples; she gave two of them to Alice. How many did she keep?
19. Henry bought five oranges. After giving Edward three, how many had he left?

**EXERCISE 4 (Oral)**

1. Tom bought six marbles and John gave him three. How many marbles did Tom then have?
2. There are six desks in the first row and four in the second. How many desks are in the two rows?
3. Seven pears and two pears are how many?
4. Seven plums and three plums are how many?
5. Seven goats and three goats are how many?
6. Seven and three are how many?
7. Six marbles and two marbles are how many?
8. Six hogs and two hogs are how many?
9. Six and two are how many?
10. Six boys and four boys are how many?
11. Six girls and four girls are how many?
12. Six and four are how many?
13. Five marbles and five marbles are how many?
14. Five inches and five inches are how many?
15. Five and five are how many?
16. Four roses and six roses are how many?
17. Four pens and six pens are how many?
18. Four and six are how many?
19. Four sheep and seven sheep are how many?
20. Four cows and seven cows are how many?
21. Four and seven are how many?
22. Five cents and six cents are how many?
23. Five pencils and six pencils are how many?
24. Five and six are how many?

**EXERCISE 5 (Oral)**

How many are :

1. 1 and 1 ?	1 and 3 ?	1 and 5 ?	1 and 8 ?
2. 2 and 2 ?	2 and 4 ?	2 and 6 ?	2 and 8 ?
3. 1 and 4 ?	1 and 9 ?	3 and 1 ?	3 and 3 ?
4. 3 and 5 ?	3 and 6 ?	3 and 8 ?	3 and 2 ?
5. 4 and 1 ?	4 and 3 ?	4 and 5 ?	4 and 4 ?
6. 4 and 7 ?	4 and 2 ?	5 and 1 ?	5 and 3 ?
7. 5 and 5 ?	5 and 6 ?	5 and 2 ?	6 and 2 ?
8. 6 and 4 ?	6 and 3 ?	7 and 3 ?	3 and 7 ?
9. 7 and 4 ?	4 and 7 ?	7 and 5 ?	5 and 7 ?
10. 8 and 2 ?	2 and 8 ?	9 and 1 ?	2 and 9 ?

11. Mary has four apples and Kate has five. How many apples have both ?

12. Dick has three pencils and Alex has two. How many pencils have both ?

13. Robert has five chickens and Mary has four. How many chickens have both ?

14. William has seven oranges and his brother has two. How many oranges have both ?

15. A boy walks two miles in the forenoon and three miles in the afternoon. How many miles does he walk ?

16. A man has seven dollars in one pocket and five dollars in another pocket. How much money has he in both pockets ?

**EXERCISE 6 (Oral)**

1. John had seven cents and spent three. How many cents had he left?
2. Alice had eight plums and gave Mary four. How many plums has Alice?
3. A boy caught nine fish and gave four to his brother. How many did he keep?
4. Mary had four roses and gave away one. How many had she left?
5. Henry had eleven cents and gave five for a pencil. How many cents did he then have?
6. A girl had nine sticks of candy and gave six to her schoolmates. How many did she keep?
7. If a boy has ten cents and gives five cents for a newspaper, how many cents has he left?
8. If a boy has ten cents and gives three cents for an apple, how much has he left?
9. If a boy has ten cents and gives one cent for an afternoon paper, how much has he left?
10. Eight birds were on the tree, but three flew away. How many remained?
11. Eight cakes were on the table; Tom ate five of them, and Mary the remainder. How many cakes did Mary eat?
12. A family bought seven pounds of butter and ate two the first week. How many pounds remained?

**EXERCISE 7 (Oral)**

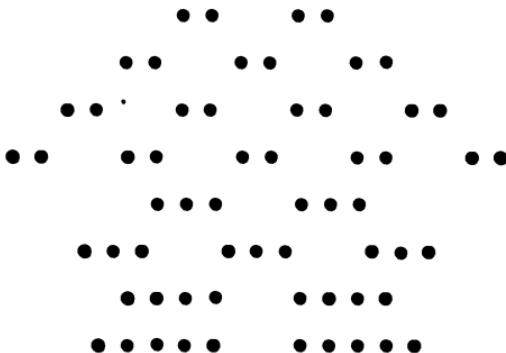
1. A boy had eight marbles and lost three. How many marbles did he then have ?
2. Eight less three are how many ?
3. Henry bought nine fishhooks and broke three. How many fishhooks has Henry ?
4. Nine less three are how many ?
5. There were ten birds in a tree and two flew away. How many birds remained in the tree ?
6. How many are ten less two ?
7. Oscar has ten cents and James has four cents. How many more cents has Oscar than James ?
8. Ten less four are how many ?
9. Henry had nine cents and spent five. How many cents had he left ?
10. Nine less five are how many ?
11. Nine boys were in school yesterday, two boys are in school to-day. How many boys are out of school ?
12. Nine less two are how many ?
13. A farmer had ten cows and sold five. How many cows has the farmer ?
14. Ten less five are how many ?
15. A man had nine houses and sold four of them. How many houses has the man now ?
16. How many are nine less four ?

## EXERCISE 8 (Oral)

Read and give the correct number in each blank :

1. 2 and \_\_\_\_ are 4. 2 and \_\_\_\_ are 6.
2. 2 and \_\_\_\_ are 7. 2 and \_\_\_\_ are 9.
3. 3 and \_\_\_\_ are 6. 3 and \_\_\_\_ are 8.
4. 4 and \_\_\_\_ are 5. 4 and \_\_\_\_ are 7.
5. 5 and \_\_\_\_ are 7. 5 and \_\_\_\_ are 8.
6. 1 and \_\_\_\_ are 8. 1 and \_\_\_\_ are 6.
7. 6 and \_\_\_\_ are 9. 6 and \_\_\_\_ are 8.
8. 2 and \_\_\_\_ are 7. 1 and \_\_\_\_ are 10.
9. 7 and \_\_\_\_ are 9. 7 and \_\_\_\_ are 10.
10. 4 and \_\_\_\_ are 9. 1 and \_\_\_\_ are 7.
11. 5 and \_\_\_\_ are 9. 6 and \_\_\_\_ are 8.
12. 4 and \_\_\_\_ are 7. 3 and \_\_\_\_ are 10.
13. When a pint of milk sells for 4 cents, how much will two pints cost ?
14. What is the value of three two-cent stamps ?
15. What is the value of two three-cent stamps ?
16. What is the value of three three-cent stamps ?
17. What is the value of two four-cent stamps ?
18. What is the value of two five-cent stamps ?
19. What will two pounds of sugar cost at 5 cents a pound ?
20. What will two pounds of rice cost at 5 cents a pound ?

**EXERCISE 9 (Oral)**



1. Two and two are how many ?
2. How many twos make four ?
3. Two and two and two are how many ?
4. How many twos make six ?
5. Two, two, two, and two are how many ?
6. How many twos make eight ?
7. Two, two, two, two, and two are how many ?
8. How many twos make ten ?
9. Three and three are how many ?
10. How many threes make six ?
11. Four and four are how many ?
12. How many fours make eight ?
13. Five and five are how many ?
14. How many fives make ten ?
15. Count by twos to ten beginning with two.
16. Count by twos to nine beginning with one.
17. Three, three, and three are how many ?
18. How many threes make nine ?

19. Count by threes to nine.
20. How many are two twos and three?
21. How many are two threes and two?
22. How many are two fours and one?
23. How many are two twos and five?
24. How many are two twos and four?
25. How many are three ones and four?
26. How many are three twos and four?
27. How many are two fours and two?
28. How many cents are in a dime?
29. How many four-cent stamps can I buy for eight cents?
30. How many one-cent stamps can I buy for a dime?
31. How many two-cent stamps can I buy for a dime?
32. How many five-cent stamps can I buy for a dime?
33. How many three-cent stamps can I buy for nine cents?
34. How many six-cent stamps can I buy for twelve cents?
35. How much will I pay for a two-cent, a three-cent, and a four-cent stamp?
36. How much will I pay for a five-cent, a three-cent, and a two-cent stamp?

## EXERCISE 10 (Written)

Add :

$$\begin{array}{r}
 3 & 2 & 3 & 4 & 3 & 5 & 7 & 1 & 2 & 3 & 5 \\
 2 & 4 & 4 & 3 & 3 & 1 & 1 & 9 & 7 & 5 & 4 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 6 & 3 & 4 & 7 & 2 & 9 & 3 & 7 & 1 & 1 & 4 \\
 3 & 6 & 5 & 2 & 8 & 1 & 7 & 3 & 6 & 7 & 4 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 8 & 6 & 6 & 2 & 5 & 4 & 1 & 1 & 2 & 8 & 4 \\
 2 & 2 & 4 & 2 & 5 & 4 & 3 & 2 & 8 & 1 & 6 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 9 & 5 & 3 & 7 & 6 & 4 & 8 & 5 & 6 & 2 & 4 \\
 3 & 7 & 6 & 4 & 5 & 7 & 3 & 6 & 3 & 9 & 5 \\
 \hline
 \end{array}$$

Subtract :

$$\begin{array}{r}
 9 & 10 & 9 & 10 & 10 & 10 & 8 & 8 & 10 & 10 & 9 \\
 2 & 2 & 3 & 3 & 4 & 7 & 7 & 3 & 8 & 5 & 4 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 8 & 8 & 8 & 8 & 7 & 7 & 7 & 7 & 6 & 6 & 6 \\
 2 & 1 & 5 & 6 & 2 & 4 & 5 & 6 & 3 & 2 & 4 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 6 & 5 & 5 & 5 & 7 & 9 & 10 & 8 & 6 & 4 & 6 \\
 1 & 3 & 4 & 5 & 7 & 9 & 10 & 8 & 6 & 4 & 5 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 10 & 2 & 4 & 9 & 3 & 9 & 4 & 2 & 9 & 4 & 3 \\
 9 & 1 & 3 & 7 & 2 & 8 & 1 & 2 & 6 & 2 & 3 \\
 \hline
 \end{array}$$

## EXERCISE 11 (Written)

Add:

5	5	5	5	5	5	5	5	5	5	1
1	5	1	4	1	3	1	3	2	2	8
1	0	2	1	3	2	4	1	1	2	1
1	1	2	1	2	6	2	6	6	6	7
7	6	7	6	6	1	4	4	2	1	1
1	1	1	1	1	1	1	1	2	3	1
3	3	3	3	3	3	3	3	3	3	3
1	2	7	5	4	3	5	3	1	4	3
1	5	0	2	2	3	1	2	6	1	4
2	2	2	2	2	2	2	2	2	2	2
1	6	5	4	3	3	3	1	2	5	8
7	2	3	4	5	4	3	4	5	1	0
6	6	6	6	7	7	8	9	7	1	1
2	4	1	1	1	3	1	1	1	1	1
2	0	3	2	1	0	1	0	2	8	5
1	1	2	3	0	0	2	6	5	8	2
3	1	2	0	3	2	6	0	3	0	1
3	1	2	7	7	8	3	2	0	2	5

**NOTE.** In adding columns of figures, the sums only should be named. Thus, in adding 3, 4, 2, the pupil should say, three, seven, nine.

**EXERCISE 12 (Oral)**

## NUMBERS FROM TEN TO TWENTY

Eleven means ten and one.

Twelve means ten and two.

Thirteen means ten and three.

Fourteen means ten and four.

Fifteen means ten and five.

Sixteen means ten and six.

Seventeen means ten and seven.

Eighteen means ten and eight.

Nineteen means ten and nine.

Twenty means two tens, or ten and ten.

Twenty means two tens, or ten.

umber comes next after thirteen

es next after fifteen? What number come

next after sixteen? What is the next number after eighteen? What is the next number after seventeen? What is the next number after eleven? What is the next number after fourteen? What number is next after twelve? What number is next after nineteen? What number comes next before thirteen? What number comes next before fifteen? What number comes

next before seventeen? What number comes next before eleven? What number comes next before twenty? What number comes next before sixteen? What number comes next before nineteen? What number comes next before eighteen?

1. How many are eleven and two?
2. How many are thirteen and two?
3. How many are fifteen and two?
4. How many are seventeen and two?
5. How many are twelve and two?
6. How many are fourteen and two?
7. How many are sixteen and two?
8. How many are eighteen and two?
9. How many are twelve and four?
10. How many are thirteen and five?
11. How many are eleven and six?
12. How many are fifteen and four?
13. How many are sixteen and three?
14. How many are fourteen and five?

#### NOTATION

Thirteen is written 13.

Fifteen is written 15.

Seventeen is written 17.

Nineteen is written 19.

Fourteen is written 14.

Sixteen is written 16.

Eighteen is written 18.

Twenty is written 20.

## EXERCISE 18 (Written)

Fill in blanks :

1. Ten and —— make 13.
2. Ten and —— make 16.
3. Ten and —— make 15.
4. Ten and —— make 18.
5. Ten and —— make 17.
6. Ten and —— make 11.
7. Ten and —— make 12.
8. Ten and —— make 19.
9. Ten and —— make 14.
10. Ten and —— make 20.
11. Sixteen less —— makes 6.
12. Nineteen less —— makes 9.
13. Fourteen less —— makes 4.
14. Fifteen less —— makes 5.
15. Eighteen less —— makes 10.
16. Seventeen less —— makes 10.
17. Twelve less —— makes 10.
18. Thirteen less —— makes 10.
19. Eleven less —— makes 10.
20. Twenty less —— makes 10.
21. Five and —— make 13.
22. Eight and —— make 14.
23. Four and —— make 12.

## EXERCISE 14 (Oral)

How many are :

7 and 3 ?	6 and 5 ?	12 and 3 ?
7 and 5 ?	9 and 2 ?	3 and 12 ?
6 and 6 ?	9 and 4 ?	7 and 7 ?
8 and 3 ?	2 and 9 ?	8 and 8 ?
3 and 8 ?	3 and 10 ?	12 and 4 ?
8 and 4 ?	11 and 2 ?	4 and 12 ?
4 and 8 ?	2 and 11 ?	8 and 6 ?
5 and 8 ?	12 and 2 ?	9 and 6 ?
5 and 9 ?	2 and 12 ?	7 and 8 ?

+ is called *plus*. When + is written between two numbers it shows that they are to be added.

= means is, are, *equal*, or *equals*.

## DRILL WORK

$6 + 4 = ?$	$8 + 4 = ?$	$2 + 11 = ?$	$10 + 5 = ?$
$3 + 7 = ?$	$9 + 3 = ?$	$9 + 5 = ?$	$7 + 8 = ?$
$2 + 8 = ?$	$6 + 6 = ?$	$8 + 6 = ?$	$6 + 9 = ?$
$4 + 6 = ?$	$7 + 6 = ?$	$7 + 7 = ?$	$5 + 10 = ?$
$5 + 5 = ?$	$8 + 5 = ?$	$6 + 8 = ?$	$4 + 11 = ?$
$6 + 5 = ?$	$9 + 4 = ?$	$5 + 9 = ?$	$3 + 12 = ?$
$8 + 3 = ?$	$6 + 7 = ?$	$4 + 10 = ?$	$8 + 8 = ?$
$9 + 2 = ?$	$5 + 8 = ?$	$3 + 11 = ?$	$7 + 9 = ?$
$7 + 4 = ?$	$4 + 9 = ?$	$8 + 7 = ?$	$6 + 10 = ?$
$5 + 7 = ?$	$3 + 10 = ?$	$9 + 6 = ?$	$9 + 7 = ?$

**EXERCISE 15 (Oral)**

1. A farmer has six bushels of corn and five bushels of oats ; he mixes them for feed for his horses. How many bushels of feed has he ?
2. A farmer has eight cows in one pasture and six in another. How many cows has the farmer ?
3. Harry has six cents in one pocket and nine in another. How many cents has Harry ?
4. There are seven geese in one flock and eight in another. How many geese are in the two flocks ?
5. If one quart of milk costs five cents, how many cents will two quarts cost ?
6. If one pound of cherries cost eight cents, how many cents will two pounds cost ?
7. One loaf of bread costs eight cents ; another loaf of bread costs nine cents. How many cents do the two loaves cost ?
8. How many cents will you pay for three newspapers at three cents apiece ?
9. A boy rode his bicycle seven miles in the morning and four miles in the afternoon. How many miles did he ride ?
10. Henry walks nine blocks to school and nine blocks home. How many blocks does Henry walk ?
11. There are nine chairs in one room and seven in another. How many chairs are in both rooms ?

12. Suppose there are eleven books on one shelf and four on another. How many books are on both shelves?

13. If there are six rooms on the first floor of a house and eleven on the second floor, how many rooms are in the house?

14. There are two schoolhouses; one has twelve rooms, the other has seven. How many rooms are in both?

15. One train has eight cars, another has twelve. How many cars are in both trains?

**EXERCISE 16 (Oral)**

1. William has seven marbles. How many must he buy to make eleven?

2. John has six nickels in his bank. How many more must he put into his bank to make twelve?

3. A newsboy had thirteen papers and sold nine. How many more has he to sell?

4. A man gave a dime for a newspaper that cost three cents. How many cents change did he get?

5. Henry had fifteen cents; he gave six cents for two pencils. How many cents had he left?

6. A farmer had sixteen sheep and sold nine. How many sheep has the farmer?

7. A farmer had seventeen tons of hay and sold nine. How many tons of hay were left?

8. There are eighteen rows of corn in a garden. If a boy hoes nine rows one morning, how many must he hoe in the afternoon to finish?

9. If a man has thirteen dollars and buys a suit of clothes for five dollars, how many dollars has he left?

10. A man had fourteen cattle and sold seven. How many cattle has he left?

11. There are seventeen acres of land in a field; six acres are planted in corn and the remainder in oats. How many acres are planted in oats?

12. There are eighteen acres in a field. A boy plowed seven acres one week. How many acres remained to be plowed?

13. If there were nineteen desks in the schoolroom and twelve were taken out, how many are now in the schoolroom?

14. A man had seventeen goats and sold eight. How many goats has he now?

15. There are sixteen pupils in the room; five of them are girls. How many boys are in the room?

16. There are seventeen desks in a room. If four are removed, how many will remain?

17. A man has a ten-dollar bill and a five-dollar bill. How much would he have after paying for a suit of clothes costing twelve dollars?

18. A boy has sixteen cents. How many cents will he have when he spends five cents?

## EXERCISE 17 (Written)

Add:

$$\begin{array}{r} 3 \\ 1 \\ 8 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 1 \\ 7 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 5 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 8 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 1 \\ 5 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 3 \\ 6 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 3 \\ 5 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 4 \\ 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 5 \\ 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 9 \\ 1 \\ 6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 1 \\ 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 8 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 9 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 8 \\ 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 1 \\ 5 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 7 \\ 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 5 \\ 2 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ 1 \\ 5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 \\ 9 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 \\ 5 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 1 \\ 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 9 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 1 \\ 5 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 8 \\ 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 3 \\ 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 1 \\ 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 7 \\ 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 4 \\ 1 \\ 6 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 1 \\ 9 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 7 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 1 \\ 4 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 6 \\ 7 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 6 \\ 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 \\ 3 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 3 \\ 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 9 \\ 8 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 9 \\ 1 \\ 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 \\ 7 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 1 \\ 4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 1 \\ 9 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 6 \\ 6 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 6 \\ 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 7 \\ 3 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9 \\ 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 8 \\ 8 \\ \hline 8 \end{array}$$

5	5	5	7	7	7
6	6	6	6	6	6
7	8	9	6	7	5
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
3	3	3	4	4	4
7	7	7	7	7	7
6	7	8	9	6	7
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
5	5	5	8	8	8
7	7	7	7	7	7
6	7	8	5	3	4
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>

## EXERCISE 18 (Written)

1.  $3 + 3 + 5 = ?$
2.  $3 + 3 + 7 = ?$
3.  $3 + 3 + 9 = ?$
4.  $4 + 4 + 4 = ?$
5.  $4 + 4 + 6 = ?$
6.  $4 + 4 + 8 = ?$
7.  $5 + 5 + 3 = ?$
8.  $5 + 5 + 5 = ?$
9.  $5 + 5 + 7 = ?$
10.  $5 + 5 + 9 = ?$
11.  $6 + 6 + 1 = ?$
12.  $6 + 6 + 3 = ?$
13.  $6 + 6 + 5 = ?$
14.  $6 + 6 + 6 = ?$
15.  $6 + 6 + 8 = ?$
16.  $7 + 7 + 1 = ?$
17.  $7 + 7 + 3 = ?$
18.  $7 + 7 + 5 = ?$
19.  $7 + 7 + 6 = ?$
20.  $8 + 8 + 1 = ?$
21.  $8 + 8 + 3 = ?$
22.  $8 + 8 + 4 = ?$
23.  $9 + 9 + 1 = ?$
24.  $9 + 9 + 2 = ?$
25.  $8 + 2 + 6 = ?$
26.  $8 + 2 + 9 = ?$
27.  $6 + 2 + 9 = ?$
28. How many are 4 and 3 and 5? 4, 3, and 9? 8, 3, and 4? 8, 3, and 7? 8, 3, and 9? 9, 3, and 5? 9, 3, and 8? 3, 4, and 8? 3, 4, and 6? 7, 5, and 7? 6, 5, and 9? 2, 6, and 7? 2, 6, and 9? 3, 6, and 7? 3, 6, and 9? 4, 6, and 8? 4, 6, and 9? 5, 6, and 9? 6, 8, and 5? 6, 7, and 7? 8, 3, and 8? 3, 8, and 3? 7, 2, and 8? 5, 2, and 7? 9, 4, and

2? 2, 9, and 3? 3, 7, and 2? 2, 8, and 3? 6, 2, and 5? 6, 2, and 7? 9, 3, and 8? 7, 8, and 4? 7, 4, and 7?

29. How many are 9, 3, and 3? 5, 9, and 5? 7, 6, and 7? 7, 2, and 7? 8, 4, and 8?

30. How many are 9, 2, and 9? 8, 9, and 3? 6, 9, and 5? 3, 9, and 8? 9, 6, and 5? 9, 4, and 7? 9, 3, and 6? 8, 7, and 4? 5, 7, and 6? 8, 2, and 3? 4, 8, and 3? 6, 3, and 8?

31. How many are 4, 3, and 7? 3, 6, and 6? 7, 6, and 6? 8, 6, and 6? 6, 7, and 6? 8, 8, and 3? 8, 5, and 7? 7, 6, and 5? 9, 6, and 2? 9, 8, and 2? 4, 8, and 8? 1, 9, and 9?

32. How many are 3, 8, and 9? 3, 6, and 9? 3, 3, and 8? 2, 2, and 9? 1, 1, and 9? 1, 1, and 7? 2, 2, and 5? 6, 6, and 1? 7, 7, and 2? 7, 4, and 7? 7, 7, and 5? 8, 8, and 1?

#### EXERCISE 19 (Oral)

1. Jennie bought thirteen plums, and gave Alice five of them. How many plums did Jennie keep?

2. Oscar had fifteen cents and lost eight cents. How many cents did he then have?

3. A farmer planted seventeen acres in corn and cotton; six acres were corn. How many acres did the farmer plant in cotton?

4. A trader bought eighteen calves and sold nine of them. How many calves did the trader then have?

5. A farmer's wife raised seventeen turkeys; she sold eight of them to a neighbor and kept the remainder. How many did she keep?

Copy and subtract:

$$6. \quad \begin{array}{r} 16 \\ - 5 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ - 7 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ - 9 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ - 6 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ - 8 \\ \hline \end{array}$$

$$7. \quad \begin{array}{r} 14 \\ 7 \\ \hline \end{array} \quad \begin{array}{r} 12 \\ 8 \\ \hline \end{array} \quad \begin{array}{r} 13 \\ 6 \\ \hline \end{array} \quad . \quad \begin{array}{r} 17 \\ 4 \\ \hline \end{array} \quad \begin{array}{r} 17 \\ 9 \\ \hline \end{array}$$

<b>a.</b>	<b>18</b>	<b>18</b>	<b>17</b>	<b>17</b>	<b>19</b>
	<u>8</u>	<u>9</u>	<u>6</u>	<u>11</u>	<u>12</u>

<b>9.</b>	<b>19</b>	<b>19</b>	<b>18</b>	<b>18</b>	<b>17</b>
	<u>7</u>	<u>13</u>	<u>6</u>	<u>5</u>	<u>4</u>

<b>10.</b>	<b>15</b>	<b>15</b>	<b>19</b>	<b>16</b>	<b>13</b>
	<u>9</u>	<u>3</u>	<u>8</u>	<u>4</u>	<u>7</u>

— is called *minus*. When — is written between two numbers it shows that the number on the right is to be subtracted from the number on the left.

## DRILL WORK

$$8 - 3 = ? \quad 13 - 5 = ? \quad 9 - 6 = ? \quad 11 - 6 = ?$$

$$8 - 5 = ? \quad 13 - 8 = ? \quad 8 - 4 = ? \quad 16 - 8 = ?$$

$$10 - 3 = ? \quad 14 - 7 = ? \quad 12 - 8 = ? \quad 15 - 6 = ?$$

$$10 - 7 = ? \quad 14 - 9 = ? \quad 12 - 4 = ? \quad 15 - 9 = ?$$

$$9 - 3 = ? \quad 11 - 5 = ? \quad 9 - 5 = ? \quad 13 - 6 = ?$$

**EXERCISE 20 (Oral)**

$$12 \text{ inches} = 1 \text{ foot.}$$

**Sum** is the result of adding two or more numbers.

1. What is the sum of six inches and six inches ?
2. What are two times six inches ?
3. How many inches are in one half of a foot ?
4. What is the sum of four inches, four inches, and four inches ?
5. A foot is how many times four inches ?
6. What part of a foot is four inches ?
7. What is one half of four inches ?
8. What is one half of six inches ?
9. What is one half of eight inches ?
10. What is one half of ten inches ?
11. What is the sum of two inches, two inches, and two inches ?
12. Six inches is how many times two inches ?
13. What is one third of six inches ?
14. What part of six inches is two inches ?
15. What is the sum of three inches, three inches, and three inches ?
16. What is one third of nine inches ?
17. What part of nine inches is three inches ?
18. How many inches are three inches, three inches, three inches, and three inches ?

19. Twelve inches is how many times three inches?
20. What is one fourth of twelve inches?
21. What part of a foot is three inches?
22. How many six-inch lengths are in one foot?
23. How many four-inch lengths are in one foot?
24. How many three-inch lengths are in one foot?
25. One third of 12 = ?    28. One fourth of 8 = ?
26. One half of 12 = ?    29. One half of 10 = ?
27. One fourth of 12 = ?    30. One half of 20 = ?

One half is written  $\frac{1}{2}$ .

One third is written  $\frac{1}{3}$ .

One fourth is written  $\frac{1}{4}$ .

#### EXERCISE 21 (Oral)

• • • • • • • • • • • • •

Count by twos to twenty. How many twos are in twenty?

• • •    • • •    • • •    • • •    • • •

Count by threes to eighteen. How many threes are in eighteen? How many threes are in fifteen?

• • •    • • •    • • •    • • •    • • •

Count by fours to twelve. How many fours are in twelve? What is  $\frac{1}{2}$  of twelve?

Count by fours to sixteen. How many fours are in sixteen? What is  $\frac{1}{4}$  of sixteen?

Count by fours to twenty. How many fours are in twenty?

•••••

•••••

•••••

•••••

Count by fives to fifteen. How many fives are in fifteen?

Count by fives to twenty. How many fives are in twenty?

What is the sum of 2 and 2? What is the half of 4? How many twos make four?

What is the sum of 3 and 3? What is the half of 6? How many 3's make 6?

What is the sum of 4 and 4? What is the half of 8? How many 4's make 8?

What is the sum of 5 and 5? What is the half of 10? How many 5's make 10?

What is the sum of 7 and 7? What is the half of 14? How many 7's make 14?

What is the sum of 8 and 8? What is the half of 16? How many 8's make 16?

What is the sum of 9 and 9? What is the half of 18? How many 9's make 18?

What is the sum of 10 and 10? What is the half of 20? How many 10's make 20?

**EXERCISE 22 (Oral)**

What is the sum of 2 and 2? How many are two times two?

What is the sum of 2, 2, and 2? How many are 3 times 2?

What is the sum of 2, 2, 2, and 2? How many are 4 times 2?

$2+2+2+2+2=?$  How many are 5 times 2?

$2+2+2+2+2+2=?$  How many are 6 times 2?

How many are 7 times 2? 8 times 2? 9 times 2?

10 times 2?

$3+3=?$  How many are 2 times 3?

$3+3+3=?$  How many are 3 times 3?

$3+3+3+3=?$  How many are 4 times 3?

$3+3+3+3+3=?$  How many are 5 times 3?

How many are 6 times 3?

$4+4=?$  How many are 2 times 4?

$4+4+4=?$  How many are 3 times 4?

$4+4+4+4=?$  How many are 4 times 4?

How many are 5 times 4?

$5+5=?$  How many are 2 times 5?

$5+5+5=?$  How many are 3 times 5?

How many are 4 times 5?

$6+6=?$  How many are 2 times 6?

$6+6+6=?$  How many are 3 times 6?

$\times$  written between two numbers means *times*, or *multiplied by*. Thus,  $2 \times 2 = 4$ ;  $3 \times 4 = 12$ ;  $4 \times 4 = 16$ ;  $3 \times 5 = 15$ .

### EXERCISE 23 (Written)

Copy and complete:

$$2 \times 2 = ?$$

$$7 \times 2 = ?$$

$$4 \times 3 = ?$$

$$2 \times 3 = ?$$

$$2 \times 8 = ?$$

$$3 \times 5 = ?$$

$$3 \times 2 = ?$$

$$8 \times 2 = ?$$

$$5 \times 3 = ?$$

$$2 \times 4 = ?$$

$$2 \times 9 = ?$$

$$3 \times 6 = ?$$

$$4 \times 2 = ?$$

$$9 \times 2 = ?$$

$$6 \times 3 = ?$$

$$2 \times 5 = ?$$

$$10 \times 2 = ?$$

$$4 \times 3 = ?$$

$5 \times 2 = ?$

$2 \times 10 = ?$

$4 \times 5 = ?$

$2 \times 6 = ?$

$3 \times 3 = ?$

$5 \times 4 = ?$

$2 \times 7 = ?$

$3 \times 4 = ?$

$7 \times 1 = ?$

How many 2's are in 6? How many 2's are in 10?

How many 2's are in 14? How many 2's are in 18?

How many 2's are in 20? How many 3's are in 6?

How many 3's are in 12? How many 3's are in 15?

How many 3's are in 18? How many 4's are in 8?

How many 4's are in 12? How many 4's are in 16?

How many 4's are in 20? How many 5's are in 10?

How many 5's are in 15? How many 5's are in 20?

**EXERCISE 24 (Oral)**

1. A loaf of bread costs 5¢. What will 3 loaves cost (¢ stands for cent or cents)?
2. If a doll costs 6¢, what will 3 dolls cost?
3. If a man earns \$2 a day, how much will he earn in 4 days (\$ stands for dollar or dollars)?
4. If a farmer earns \$3 a day, how much will he earn in 4 days?
5. A man sells 4 calves, for \$4 each. How much does he get for his calves?
6. If eggs sell for 3¢ apiece, what will six eggs cost?
7. When sugar sells at 5¢ a pound, what will 4 pounds cost?
8. If land rents for \$3 an acre, for how much will 6 acres rent?

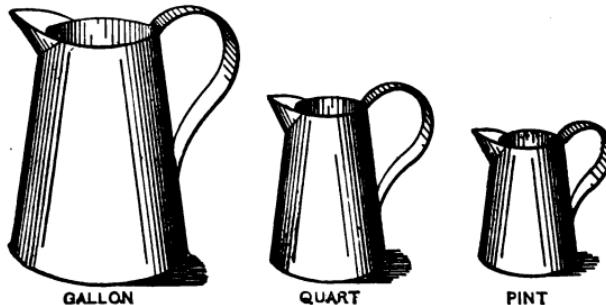
9. If a boy can walk 3 miles in an hour, how far can he walk in 3 hours?
10. How much will 2 five-cent stamps and 3 two-cent stamps cost?
11. How much will 4 three-cent stamps and 1 two-cent stamp cost?
12. If two pencils cost 10¢, what will one pencil cost?
13. If two blank books cost 16¢, what will one blank book cost?
14. If two copy books cost 20¢, what will one copy book cost?
15. If two bottles of ink cost 8¢, what will one bottle cost?
16. If two tops cost 14¢, what will one top cost?
17. When two yards of calico cost 18¢, what will one yard cost?
18. If a pair of shoes costs \$3, how many pairs can be bought for \$6?
19. If a horse travels 12 miles in 2 hours, how far will he go in one hour?

**EXERCISE 25 (Written)**

Copy and complete :

$3 + 3 + 2 = ?$	$4 + 6 + 6 = ?$
$4 + 4 + 3 = ?$	$5 + 7 + 7 = ?$
$5 + 5 + 1 = ?$	$1 + 9 + 9 = ?$
$6 + 6 + 5 = ?$	$1 + 8 + 8 = ?$
$6 + 6 + 3 = ?$	$1 + 7 + 7 = ?$

$7 + 7 + 2 = ?$	$2 + 8 + 8 = ?$
$7 + 7 + 4 = ?$	$2 + 6 + 6 = ?$
$7 + 7 + 6 = ?$	$2 + 5 + 5 = ?$
$7 + 7 + 3 = ?$	$2 + 4 + 4 + 4 = ?$
$8 + 8 + 1 = ?$	$2 + 5 + 5 + 5 = ?$
$8 + 8 + 3 = ?$	$2 + 6 + 6 + 6 = ?$
$8 + 8 + 2 = ?$	$3 + 4 + 4 + 4 = ?$
$9 + 9 + 1 = ?$	$3 + 5 + 5 + 5 = ?$
$9 + 9 + 2 = ?$	$4 + 4 + 4 + 5 = ?$
$4 + 8 + 8 = ?$	$5 + 4 + 4 + 4 = ?$
$3 + 7 + 7 = ?$	$2 + 2 + 2 + 2 + 1 = ?$
$3 + 6 + 6 = ?$	$3 + 3 + 3 + 3 + 1 = ?$
$5 + 6 + 6 = ?$	$4 + 4 + 4 + 4 + 2 = ?$
$4 + 7 + 7 = ?$	$3 + 3 + 3 + 3 + 2 = ?$
$4 + 5 + 5 = ?$	$4 + 4 + 4 + 4 + 3 = ?$

**EXERCISE 26 (Oral)**

2 pints = 1 quart

4 quarts = 1 gallon

How many pints are in 2 quarts? How many pints are in 3 quarts? How many pints are in 4 quarts? How many pints are in 5 quarts? How

many pints are in 6 quarts? How many pints are in 7 quarts? How many pints are in 8 quarts?

How many quarts are in 2 gallons? How many quarts are in 3 gallons? How many quarts are in 4 gallons? How many quarts are in 5 gallons?

How many pints are in 4 quarts? How many pints are in 1 gallon?

How many pints are in 1 gallon and 1 quart?

How many pints are in 2 quarts and 1 pint? How many pints are in 3 quarts and 1 pint? How many pints are in 1 gallon and 2 quarts?

What part of a quart is a pint? What part of a gallon is 2 quarts? How many pints are in a half gallon?

1. If a pint of milk sells for 3¢, for what will a quart sell?
2. If a quart of milk sells for 5¢, for what will a gallon sell?
3. If a quart of milk sells for 4¢, for what will a half gallon sell?
4. One quart is drawn out of a can containing 1 gallon of molasses. How many quarts of molasses remain in the can?
5. If you take 1 pint out of a can containing a half gallon of oil, how many pints of oil will remain in the can?
6. If a pint of milk costs four cents, what will three pints cost?

7. If a quart of kerosene oil sells for five cents, what will two quarts cost? Three quarts?
8. Three pints of milk are sold from a vessel containing a gallon. How many pints remain in the vessel?
9. If three pints and two pints of vinegar are drawn from a vessel containing a gallon, how many pints remain?
10. How many quarts are there in two gallons and three quarts?
11. How many quarts are there in three gallons and one quart?
12. How many quarts are there in three gallons and three quarts?
13. How many pints are there in four quarts and one pint?
14. How many pints are there in six quarts and one pint?
15. How many pints are in one gallon and one quart?
16. How many pints are in one gallon and three quarts?
17. How many pints are in two gallons and one quart?
18. If three quarts are taken out of a vessel containing one gallon and two quarts, how many quarts remain?

**EXERCISE 27 (Oral)**

1. How many 2's are in 5? 7? 9? 11? 13? 15?
2. How many 3's are in 5? 8? 10? 13? 17? 19?
3. How many 4's are in 7? 11? 9? 15? 14? 17?
4. How many 5's are in 9? 11? 13? 16? 18?  
17? 12?
5. How many 6's are in 16? 19? 20? 13? 14? 15?
6. How many 7's are in 13? 15? 17? 19? 20? 9?
7. How many 8's are in 11? 14? 17? 15? 18?  
20? 19?
8. How many 9's are in 13? 17? 15? 19? 20?  
16? 10?
9. How often is 3 inches contained in 12 inches?
10. How often is 4 inches contained in 12 inches?
11. How often is 4 inches contained in 16 inches?
12. How often is 4 inches contained in 1 foot?
13. How often is 6 inches contained in 1 foot?
14. How often is 6 inches contained in 1 foot and  
a half foot?
15. How often is 3 inches contained in 1 foot and  
a half foot?
16. How often is 3 inches contained in 13 inches?
17. How often is 4 inches contained in 13 inches?
18. How often is 5 inches contained in 18 inches?
19. How often is 7 inches contained in 18 inches?
20. How often is 4 inches contained in 15 inches?

**EXERCISE 28 (Oral and Written)**

Twenty-one means twenty and one, and is written 21.

Twenty-two means twenty and two, and is written 22.

Twenty-three means twenty and three, and is written 23.

Twenty-four means twenty and four, and is written 24.

Twenty-five means twenty and five, and is written 25.

Twenty-six means twenty and six, and is written 26.

Twenty-seven means twenty and seven, and is written 27.

Twenty-eight means twenty and eight, and is written 28.

Twenty-nine means twenty and nine, and is written 29.

Thirty means three tens, and is written 30.

1. How many are:

19 and 1?    19 and 2?    19 and 3?  
19 and 4?    19 and 5?

2. How many are:

18 and 2?    18 and 3?    18 and 4?  
18 and 5?    18 and 6?    18 and 7?  
18 and 8?    18 and 9?    18 and 10?

3. How many are:

17 and 3?    17 and 4?    17 and 5?  
17 and 6?    17 and 7?    17 and 8?  
17 and 9?    17 and 10?

4. How many are :

16 and 4 ?   16 and 5 ?   16 and 6 ?   16 and 7 ?  
16 and 8 ?   16 and 9 ?   16 and 10 ?

5. How many are :

15 and 5 ?   15 and 6 ?   15 and 7 ?  
15 and 8 ?   15 and 9 ?   15 and 10 ?

6. How many are :

14 and 6 ?   14 and 7 ?   14 and 8 ?  
14 and 9 ?   14 and 10 ?

7. How many are :

13 and 7 ?   13 and 8 ?   13 and 9 ?   13 and 10 ?

8. How many are :

12 and 8 ?   12 and 9 ?   12 and 10 ?

### ADDITION TABLE

1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	
2	2	2	2	2	2	2	2	2	2	2	2	2	2
0	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	
3	3	3	3	3	3	3	3	3	3	3	3	3	3
0	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	
4	4	4	4	4	4	4	4	4	4	4	4	4	4
0	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	
5	5	5	5	5	5	5	5	5	5	5	5	5	5
0	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	

6	6	6	6	6	6	6	6	6	6	6	6	6	6
0	1	2	3	4	5	6	7	8	9	10	11	12	
7	7	7	7	7	7	7	7	7	7	7	7	7	7
0	1	2	3	4	5	6	7	8	9	10	11	12	
8	8	8	8	8	8	8	8	8	8	8	8	8	8
0	1	2	3	4	5	6	7	8	9	10	11	12	
9	9	9	9	9	9	9	9	9	9	9	9	9	9
0	1	2	3	4	5	6	7	8	9	10	11	12	
10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	1	2	3	4	5	6	7	8	9	10	11	12	
11	11	11	11	11	11	11	11	11	11	11	11	11	11
0	1	2	3	4	5	6	7	8	9	10	11	12	
12	12	12	12	12	12	12	12	12	12	12	12	12	12
0	1	2	3	4	5	6	7	8	9	10	11	12	

The addition table should be put on the blackboard. Each pupil should be required to name the sum as the teacher touches at random the numbers to be added. This exercise should be continued until pupils can name instantly every sum.

#### EXERCISE 29 (Oral and Written)

1. Count to 30 by 2's, beginning at 16.
2. Count to 30 by 3's, beginning at 15.

3. Count to 30 by 4's, beginning at 14.
4. Count to 30 by 5's.
5. Count to 30 by 6's.
6. Count to 30 by 7's, beginning at 2.
7. Count to 30 by 8's, beginning at 6.
8. Count to 30 by 9's, beginning at 3.
9. Count to 30 by 10's.
10. Count to 30 by 3's, beginning at 3.
11. Count to 30 by 4's, beginning at 6.
12. Count to 30 by 5's, beginning at 5.
13. Count to 30 by 6's, beginning at 6.
14. Count to 30 by 7's, beginning at 9.
15. Count to 30 by 8's, beginning at 14.
16. Count to 30 by 9's, beginning at 12.
17. Count to 29 by 8's, beginning at 5.
18. Count to 28 by 6's, beginning at 4.
19. Count to 27 by 5's, beginning at 2.
20. Count to 26 by 7's, beginning at 5.
21. Count to 28 by 9's, beginning at 1.
22. Count to 28 by 3's, beginning at 1.
23. Count to 25 by 8's, beginning at 1.
24. Count to 26 by 7's, beginning at 5.
25. Count to 29 by 7's, beginning at 1.
26. Count to 23 by 8's, beginning at 7.
27. Count to 24 by 9's, beginning at 6.
28. Count to 29 by 9's, beginning at 2.

29. How many are :

8 and 3? 8 and 13? 7 and 5? 7 and 15?

30. 9 and 7? 9 and 17? 8 and 18? 8 and 8?

31. 6 and 4? 6 and 14? 6 and 24? 5 and 16?

32. 5 and 9? 5 and 19? 4 and 7? 4 and 17?

33. 3 and 8? 3 and 18? 5 and 14? 5 and 24?

**EXERCISE 30 (Written)**

1.  $7+5+9=?$
2.  $7+8+8=?$
3.  $7+9+7=?$
4.  $7+8+9=?$
5.  $6+9+7=?$
6.  $6+9+8=?$
7.  $6+9+9=?$
8.  $7+6+8=?$
9.  $7+9+8=?$
10.  $7+7+9=?$
11.  $6+8+9=?$
12.  $5+9+7=?$
13.  $5+8+9=?$
14.  $5+8+8=?$
15.  $5+9+8=?$
16.  $5+7+9=?$
17.  $6+7+8=?$
18.  $6+7+9=?$
19.  $6+8+9=?$
20.  $6+8+8=?$
21.  $8+6+7=?$
22.  $8+7+6=?$
23.  $8+6+8=?$
24.  $8+7+7=?$
25.  $8+7+8=?$
26.  $8+8+7=?$
27.  $7+7+7=?$
28.  $8+7+9=?$
29.  $8+9+7=?$
30.  $8+9+8=?$
31.  $8+9+9=?$
32.  $9+4+8=?$
33.  $9+5+8=?$
34.  $9+5+9=?$
35.  $9+7+8=?$
36.  $9+6+8=?$
37.  $9+8+6=?$
38.  $9+7+7=?$
39.  $9+6+6=?$
40.  $9+6+9=?$
41.  $9+6+7=?$
42.  $9+9+6=?$
43.  $9+7+6=?$
44.  $9+8+8=?$
45.  $9+8+9=?$
46.  $9+9+9=?$
47.  $7+9+7=?$
48.  $7+8+9=?$

## EXERCISE 31 (Oral and Written)

Copy and complete :

1. $20 - 2 = ?$	19. $22 - 9 = ?$	37. $24 - 10 = ?$
2. $20 - 4 = ?$	20. $22 - 10 = ?$	38. $25 - 3 = ?$
3. $20 - 5 = ?$	21. $22 - 12 = ?$	39. $25 - 4 = ?$
4. $20 - 7 = ?$	22. $22 - 13 = ?$	40. $25 - 6 = ?$
5. $20 - 8 = ?$	23. $23 - 3 = ?$	41. $25 - 8 = ?$
6. $20 - 9 = ?$	24. $23 - 4 = ?$	42. $25 - 7 = ?$
7. $21 - 2 = ?$	25. $23 - 6 = ?$	43. $25 - 9 = ?$
8. $21 - 3 = ?$	26. $23 - 7 = ?$	44. $25 - 10 = ?$
9. $21 - 5 = ?$	27. $23 - 8 = ?$	45. $26 - 3 = ?$
10. $21 - 7 = ?$	28. $23 - 5 = ?$	46. $26 - 4 = ?$
11. $21 - 9 = ?$	29. $23 - 9 = ?$	47. $26 - 6 = ?$
12. $21 - 11 = ?$	30. $23 - 10 = ?$	48. $26 - 5 = ?$
13. $21 - 12 = ?$	31. $24 - 3 = ?$	49. $26 - 8 = ?$
14. $22 - 2 = ?$	32. $24 - 5 = ?$	50. $26 - 7 = ?$
15. $22 - 3 = ?$	33. $24 - 6 = ?$	51. $26 - 9 = ?$
16. $22 - 4 = ?$	34. $24 - 8 = ?$	52. $26 - 2 = ?$
17. $22 - 6 = ?$	35. $24 - 7 = ?$	53. $27 - 4 = ?$
18. $22 - 8 = ?$	36. $24 - 9 = ?$	54. $27 - 6 = ?$

1. A boy has two dimes and pays 5¢ for a newspaper. How many cents has he left?
2. Harry has 20¢. If he buys two pencils at 3¢ each, how many cents has he left?
3. Mary has 25¢. If she buys 5¢ worth of ice cream, how much change should she get?

4. Kate has 25¢. If she buys two plates of ice cream at 5¢ each, how much change should she receive?

5. Henry has five nickels. He buys a bottle of ink for 5¢ and a pencil for 3¢. How much money has he left?

**EXERCISE 38 (Oral and Written)**

1. $7 + 6 - 4 = ?$	19. $16 + 5 - 4 = ?$
2. $9 + 8 - 5 = ?$	20. $16 + 6 - 5 = ?$
3. $7 + 9 - 8 = ?$	21. $17 + 7 - 5 = ?$
4. $8 + 9 - 7 = ?$	22. $18 + 6 - 8 = ?$
5. $12 + 5 - 8 = ?$	23. $9 - 5 + 9 = ?$
6. $11 + 6 - 7 = ?$	24. $9 - 3 + 4 = ?$
7. $11 + 8 - 5 = ?$	25. $9 - 6 + 5 = ?$
8. $12 + 7 - 6 = ?$	26. $8 - 5 + 8 = ?$
9. $16 + 3 - 8 = ?$	27. $8 - 3 + 7 = ?$
10. $15 + 4 - 9 = ?$	28. $7 - 2 + 9 = ?$
11. $16 + 5 - 3 = ?$	29. $11 - 7 + 4 = ?$
12. $16 + 6 - 4 = ?$	30. $12 - 8 + 9 = ?$
13. $9 + 5 - 8 = ?$	31. $15 - 9 + 6 = ?$
14. $8 + 7 - 6 = ?$	32. $17 - 8 + 9 = ?$
15. $9 + 6 - 7 = ?$	33. $18 - 9 + 7 = ?$
16. $9 + 9 - 8 = ?$	34. $19 - 10 + 4 = ?$
17. $8 + 9 - 6 = ?$	35. $20 - 12 + 5 = ?$
18. $17 + 3 - 8 = ?$	36. $22 - 9 + 4 = ?$

1. John had 15 marbles, lost 6, and then bought 4. How many marbles has John now?

2. Charles had 20¢; he spent 8¢ for candy and then his mother gave him a nickel. How much money did he then have?

3. Martin had a top and 12¢. He sold the top for 5¢ and spent 10¢ for a ball. How many cents had Martin left?

4. Anne has a dime and 2 nickels. If she spends 5¢ for car fare and 6¢ for pencils, how many cents will she have left?

5. Jane has 2 dimes and a nickel. If she spends 15¢ for ice cream, how many cents will she have left?

**EXERCISE 33 (Written and Oral)**

Copy and complete:

$$3 \times 6 = \quad 5 \times 3 = \quad 9 \times 2 =$$

$$6 \times 3 = \quad 5 \times 4 = \quad 9 \times 3 =$$

$$3 \times 7 = \quad 5 \times 5 = \quad 2 \times 9 =$$

$$7 \times 3 = \quad 5 \times 6 = \quad 3 \times 9 =$$

$$3 \times 8 = \quad 6 \times 2 = \quad 2 \times 10 =$$

$$8 \times 3 = \quad 6 \times 4 = \quad 2 \times 11 =$$

$$3 \times 9 = \quad 6 \times 5 = \quad 2 \times 12 =$$

$$9 \times 3 = \quad 6 \times 3 = \quad 12 \times 2 =$$

$$3 \times 10 = \quad 7 \times 2 = \quad 11 \times 2 =$$

$$10 \times 3 = \quad 7 \times 3 = \quad 10 \times 2 =$$

$$4 \times 4 = \quad 7 \times 4 = \quad 7 \times 4 =$$

$$4 \times 6 = \quad 4 \times 7 = \quad 2 \times 5 =$$

$$4 \times 7 = \quad 8 \times 2 = \quad 3 \times 5 =$$

$$4 \times 5 = \quad 8 \times 3 = \quad 2 \times 9 =$$

$5 \times 4 =$

$3 \times 8 =$

$6 \times 5 =$

$7 \times 4 =$

$9 \times 2 =$

$6 \times 3 =$

$6 \times 4 =$

$9 \times 1 =$

$7 \times 4 =$

$4 \times 3 =$

$4 \times 1 =$

$8 \times 3 =$

$3 \times 4 =$

$7 \times 1 =$

$9 \times 3 =$

1. If a dozen apples cost 10¢, what will 3 dozen cost?
2. If a calf sells for \$6, for how much will 4 calves sell?
3. If a pair of shoes cost \$4, find the cost of 6 pairs.
4. A rocking chair costs \$8. What is the cost of 3 rocking chairs?
5. A school desk costs \$3. How much will 9 desks cost?

**EXERCISE 34 (Oral)**

1. How many are:

Three 4's? Three 5's? Three 6's? Three 7's?

2. How many are:

Three 8's? Three 9's? Three 10's?

3. If 12 apples are divided equally among three boys, how many apples will each boy receive?

••••

••••

••••

4. What is the third part of 12?

5. If 15 oranges are divided equally among three girls, how many oranges will each girl receive?

•••••

•••••

•••••

6. What is the third part of 15 ?  
7. Divide 18¢ equally among three boys.  
.....        .....

8. What is the third part of 18 ?  
9. What is one third of 21 ?  
.....        .....

10. What is one third of 24 ?  
.....        .....

11. What is one third of 27 ?  
.....        .....

12. How many are :  
Four 3's ?   Four 4's ?   Four 5's ?   Four 6's ?  
Four 7's ?

13. If 12 marbles are divided equally among  
boys, how many marbles will each boy receive ?  
...        ...        ...        ...

14. What is one fourth of 12 ?  
15. What is one fourth of 16 ?  
...        ...        ...        ...

16. What is one fourth of 20 ?  
.....        .....

17. What is one fourth of 24 ?  
.....        .....

18. What is one half of 20 ?  
.....        .....

19. What is one half of 24 ?  
.....

20. How many 8's are there in 24 ?  
21. How many 6's are there in 24 ?  
22. How many 2's are in 24 ?

## EXERCISE 35 (Written and Oral)

Copy and complete:

$\frac{1}{2}$ of 6 inches =	$\frac{1}{2}$ of \$ 10 =	$\frac{1}{4}$ of \$ 20 =
$\frac{1}{2}$ of 10 inches =	$\frac{1}{2}$ of \$ 16 =	$\frac{1}{4}$ of \$ 28 =
$\frac{1}{2}$ of 12 inches =	$\frac{1}{2}$ of \$ 18 =	$\frac{1}{3}$ of 18¢ =
$\frac{1}{3}$ of 6 inches =	$\frac{1}{2}$ of \$ 20 =	$\frac{1}{3}$ of 21¢ =
$\frac{1}{3}$ of 12 inches =	$\frac{1}{3}$ of \$ 9 =	$\frac{1}{3}$ of 27¢ =
$\frac{1}{3}$ of 18 inches =	$\frac{1}{3}$ of \$ 15 =	$\frac{1}{3}$ of 30¢ =
$\frac{1}{4}$ of 8 inches =	$\frac{1}{3}$ of \$ 24 =	$\frac{1}{4}$ of 8¢ =
$\frac{1}{4}$ of 12 inches =	$\frac{1}{3}$ of \$ 27 =	$\frac{1}{4}$ of 16¢ =
$\frac{1}{4}$ of 20 inches =	$\frac{1}{3}$ of \$ 30 =	$\frac{1}{4}$ of 24¢ =
$\frac{1}{4}$ of 24 inches =	$\frac{1}{4}$ of \$ 12 =	$\frac{1}{4}$ of 28¢ =

If you divide 24¢ equally among 3 boys, how many cents will each boy get?

$24¢ \div 3$  means  $\frac{1}{3}$  of 24¢, and is read, twenty-four cents divided by three.

How often is 3¢ contained in 24¢?

$24¢ \div 3¢$  means how often is three cents contained in twenty-four cents.

÷ means division.

Copy and complete:

$15¢ \div 3 =$	$12¢ \div 4 =$	$14¢ \div 2 =$	$24¢ \div 3 =$
$21¢ \div 3 =$	$20¢ \div 4 =$	$15¢ \div 3 =$	$24¢ \div 4 =$
$18¢ \div 3 =$	$24¢ \div 4 =$	$18¢ \div 3 =$	$28¢ \div 4 =$
$24¢ \div 3 =$	$28¢ \div 4 =$	$27¢ \div 3 =$	$16¢ \div 4 =$
$27¢ \div 3 =$	$18¢ \div 2 =$	$12¢ \div 3 =$	$20¢ \div 4 =$

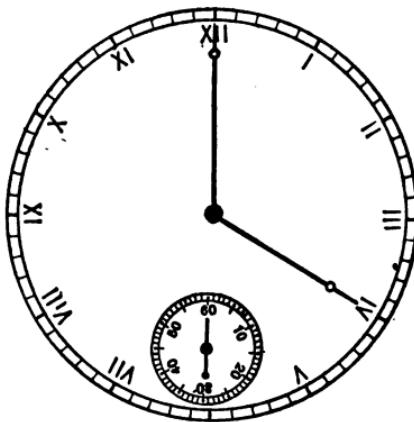
## EXERCISE 36 (Oral)

There are 24 hours in 1 day.

There are 7 days in 1 week.

There are 12 months in 1 year.

1. How many days are in 2 weeks ?
2. How many days are in 3 weeks ?
3. How many days are in 4 weeks ?
4. How many months are in 2 years ?
5. How many hours are in one half of a day ?
6. How many hours are in one third of a day ?
7. How many hours are in one fourth of a day ?
8. A man sleeps 8 hours, spends 7 hours resting, and works the remainder of the day. How many hours does the man work ?



The hours on clocks and watches are usually marked by the Roman signs for numbers.

I stands for 1.	VII stands for 7.
II stands for 2.	VIII stands for 8.
III stands for 3.	IX stands for 9.
IV or IIII stands for 4.	X stands for 10.
V stands for 5.	XI stands for 11.
VI stands for 6.	XII stands for 12.

9. How many months are in one half of a year?
10. How many months are in one third of a year?
11. How many months are in one fourth of a year?
12. Three months are what part of a year?
13. How many months are there from April to October?
14. How many months are there from November to March?
15. How many months are there in a year and a half?
16. How many months are in one year and five months? One year and seven months? One year and nine months?
17. How many months are in two years and two months? Two years and five months?
18. How many months are in one year and four months? One year and eight months? One year and ten months?
19. How many months are from June until the end of the year?
20. How many months are from February until the end of the year?
21. If a boy spends four cents a day, how many cents will he spend in a week?
22. What will a daily newspaper cost for a week at three cents a day?
23. If a man earns three dollars a day, Sunday excepted, how much will he earn in a week?

30. How many hours are there from 8 o'clock to 12 o'clock?

31. How many hours are there from 10 o'clock in the morning until noon? How many hours are there from noon until 3 o'clock in the afternoon?

32. How many hours are from noon until 11 o'clock at night? How many hours are from noon until midnight?

33. How many hours are from 10 o'clock A.M. to 1 o'clock P.M. (time from midnight to noon is A.M.; time from noon to midnight is P.M.)?

34. School begins at 9 o'clock A.M. and closes at 2 o'clock P.M. How long is the daily session?

35. If school opens at 9 o'clock A.M. and closes at 3 o'clock P.M., how long is the daily session?

36. How many hours are in a day and night?

37. How many hours are from 6 o'clock A.M. to 6 o'clock P.M.?

38. The sun rises at 7 A.M. and sets at 5 P.M. How many hours are from sunrise to sunset?

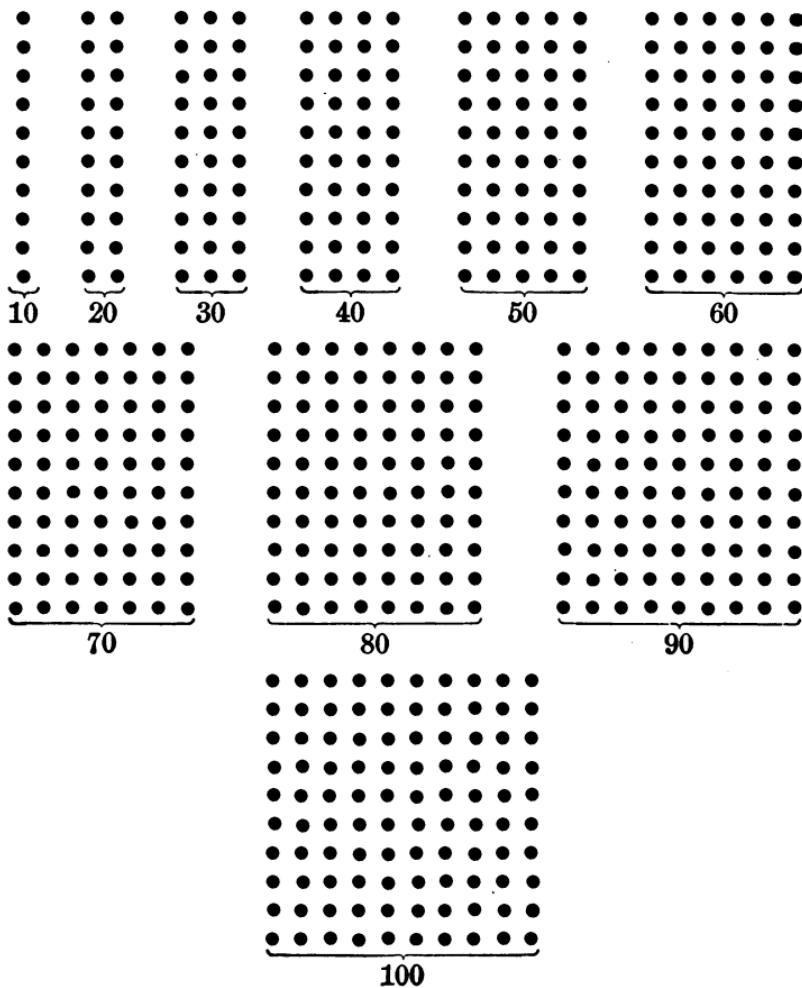
39. If the sun rises at 5 A.M. and sets at 7 P.M., how many hours are from sunrise to sunset?

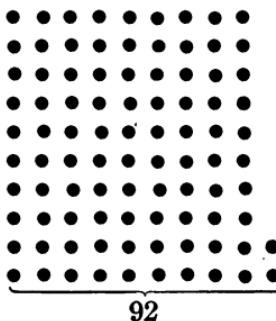
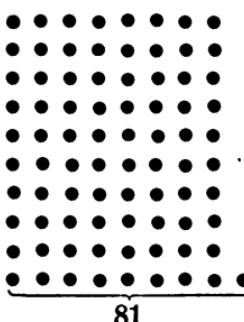
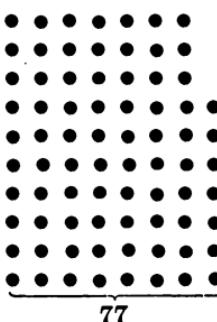
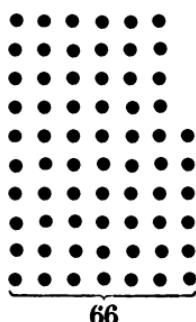
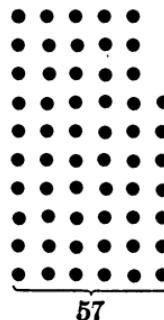
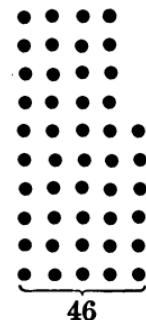
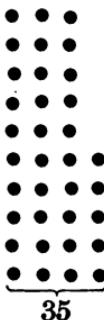
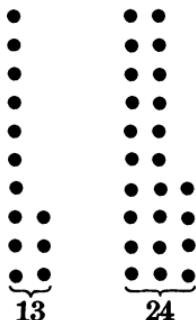
40. How many hours are from 11 A.M. to 7 P.M.?

41. How many hours are from 6 A.M. to 2 P.M.?

42. A family eats breakfast at 7 o'clock A.M. and dinner 6 hours later. What is the family's dinner hour?

Count the dots in each of the following groups:





### EXERCISE 37 (Written)

Thirty-one means three tens and one, and is written 31.

Thirty-two means three tens and two, and is written 32.

Thirty-three means three tens and three, and is written 33.

Thirty-four means three tens and four, and is written 34.

Thirty-five means three tens and five, and is written 35.

Thirty-nine means three tens and nine, and is written 39.

Forty means four tens, and is written 40.

Forty-one means four tens and one, and is written 41.

Forty-nine means four tens and nine, and is written 49.

Fifty means five tens, and is written 50.

Fifty-nine means five tens and nine, and is written 59.

Sixty means six tens, and is written 60.

Seventy means seven tens, and is written 70.

Eighty means eight tens, and is written 80.

Ninety means nine tens, and is written 90.

Ninety-nine means nine tens and nine, and is written 99.

One hundred is ten tens, and is written 100.

1. Write in figures :

Thirty-seven, thirty-eight, forty-four, forty-seven, forty-three, fifty-two, fifty-five, fifty-nine, fifty-six, fifty-four.

2. Write in figures :

Sixty-one, sixty-three, sixty-six, sixty-eight, seventy-one, seventy-three, seventy-five, seventy-seven, seventy-

nine, eighty-one, eighty-four, eighty-six, eighty-eight, eighty-nine, ninety-one, ninety-three, ninety-five, ninety-seven, ninety-six, forty-two, fifty-eight, sixty-two, ninety-eight, ninety-two.

3. How many 10's make 30? How many 10's make 50? How many 10's make 60?
4. How many 10's make 70? How many 10's make 80?
5. How many 10's make 90? How many 10's make 40?
6. How many 10's make 20? How many 10's make 100?
7. How often is 10 contained in 44?
8. How often is 10 contained in 73?
9. How often is 10 contained in 92?
10. A boy has 75 cents, consisting of a nickel and a number of dimes. How many dimes has he?
11. Mary has 86 cents in coins, consisting of a nickel, a one-cent piece, and a number of dimes. How many dimes has she?
12. Jane has 58 cents, consisting of a nickel, three one-cent pieces, and the remainder dimes. How many dimes has she?
13. Tom has 95 cents in dimes and nickels. He has one nickel. How many dimes has he?
14. Alonzo has 25 cents in nickels. How many nickels has he?

15. If I have 97 dollars and buy 9 tons of hay at 10 dollars a ton, how much money will I have left?

**EXERCISE 38 (Oral and Written)**

1. How many desks are:

29 desks and 1 desk? 29 desks and 2 desks? 29 desks and 3 desks? 29 desks and 4 desks? 29 desks and 5 desks? 29 desks and 6 desks? 29 desks and 7 desks? 29 desks and 8 desks? 29 desks and 9 desks? 29 desks and 10 desks?

2. How many pencils are:

28 pencils and 2 pencils? 28 pencils and 3 pencils? 28 pencils and 4 pencils? 28 pencils and 5 pencils? 28 pencils and 6 pencils? 28 pencils and 7 pencils? 28 pencils and 8 pencils? 28 pencils and 9 pencils? 28 pencils and 10 pencils?

3. How many dollars are:

\$27 and \$3? \$27 and \$4? \$27 and \$5? \$27 and \$6? \$27 and \$7? \$27 and \$8? \$27 and \$9? \$27 and \$10?

4. How many cents are:

26¢ and 4¢? 26¢ and 5¢? 26¢ and 6¢? 26¢ and 7¢? 26¢ and 8¢? 26¢ and 9¢? 26¢ and 10¢?

5. How many ducks are:

25 ducks and 5 ducks? 25 ducks and 6 ducks? 25 ducks and 7 ducks? 25 ducks and 8 ducks? 25 ducks and 9 ducks? 25 ducks and 10 ducks?

**6.** How many roses are :

24 roses and 6 roses ? 24 roses and 7 roses ? 24 roses and 8 roses ? 24 roses and 9 roses ? 24 roses and 10 roses ?

**7.** How many chickens are :

23 chickens and 7 chickens ? 23 chickens and 8 chickens ? 23 chickens and 9 chickens ? 23 chickens and 10 chickens ?

**8.** How many sheep are :

22 sheep and 8 sheep ? 22 sheep and 9 sheep ? 22 sheep and 10 sheep ?

**9.** How many crows are :

21 crows and 9 crows ? 21 crows and 10 crows ?

**10.** How many are :

26 and 7 ? 26 and 9 ? 27 and 7 ? 27 and 9 ? 27 and 5 ? 27 and 4 ? 29 and 5 ? 29 and 8 ? 29 and 9 ?

**11.** How many are :

29 and 6 ? 29 and 4 ? 26 and 7 ? 26 and 5 ? 26 and 8 ? 26 and 9 ? 26 and 6 ? 26 and 4 ? 25 and 7 ? 25 and 9 ? 25 and 10 ? 25 and 8 ? 25 and 6 ? 25 and 5 ? 24 and 7 ? 24 and 9 ? 24 and 10 ? 24 and 8 ? 24 and 6 ? 23 and 7 ? 23 and 9 ? 23 and 10 ? 23 and 8 ? 23 and 6 ?

**12.** How many are :

22 and 9 ? 22 and 8 ? 22 and 10 ? 28 and 3 ? 28 and 5 ? 28 and 7 ? 28 and 9 ? 28 and 10 ? 28 and 6 ? 28 and 8 ?

**13.** How many are :

28 and 4? 28 and 2? 29 and 2? 29 and 7? 29 and 3? 29 and 10? 28 and 10? 27 and 10? 24 and 10? 26 and 10?

Add :

6	3	9	9	2	4	4	9	7	8	7
7	2	8	8	7	3	7	6	5	6	6
8	3	9	2	8	9	3	3	8	6	8
5	4	1	9	9	8	7	8	3	9	7
9	5	6	8	5	5	5	9	9	8	6
<u>—</u>										
9	2	7	3	8	9	4	7	5	6	9
3	4	5	6	7	8	9	0	8	7	6
9	0	9	4	0	8	7	9	6	8	3
6	9	4	7	9	5	8	8	7	7	6
<u>—</u>										
9	8	7	6	5	8	7	7	6	5	8

**EXERCISE 39 (Oral)**

1. A farmer had 34 sheep and sold 6. How many sheep did the farmer then have?
2. A man had \$35 and bought 2 pairs of shoes at \$4 a pair. How much money had he after buying the shoes?
3. If a schoolroom contains 36 desks and 8 are taken out, how many desks remain?
4. The school attendance in a certain room is 34, but 7 pupils are absent to-day. How many pupils are in school to-day?
5. There are 35 books on a shelf and 9 books are taken off. How many remain on the shelf?

6. There are 36 eggs in a basket. If I take out 8, how many eggs will remain in the basket?
7. A farmer has 32 cattle in a certain pasture. If he takes out 7, how many cattle will remain in the pasture?
8. A man has 3 ten-dollar bills and 3 one-dollar bills. How much money will he have after paying for a suit of clothes that costs \$9?
9. Henry has 7 nickels and 2 cents. How much money will Henry have after paying for a copy book which costs 9 cents?
10. John has 3 dimes and 1 one-cent piece. After buying two oranges for 7 cents, how much money will he have?
11. A board is 34 inches long. After cutting off 9 inches, how many inches long will the remaining board be?
12. A farmer has 36 bushels of wheat. He sells 9 bushels. How many bushels of wheat has the farmer left?
13. A field contains 36 acres. It is planted in corn and potatoes. If there are 9 acres in potatoes, how many acres are in corn?

**EXERCISE 40 (Written)**

Copy and complete:

$14 - 5 =$

$15 - 8 =$

$17 - 8 =$

$24 - 5 =$

$25 - 8 =$

$28 - 8 =$

$34 - 5 =$

$35 - 8 =$

$37 - 8 =$

$16 - 8 =$

$11 - 7 =$

$18 - 9 =$

26 - 8 =	21 - 7 =	28 - 9 =
36 - 8 =	31 - 7 =	38 - 9 =
13 - 9 =	12 - 5 =	14 - 6 =
23 - 9 =	22 - 5 =	24 - 6 =
33 - 9 =	32 - 5 =	34 - 6 =
12 - 8 =	14 - 7 =	13 = 8 =
22 - 8 =	24 - 7 =	23 - 8 =
32 - 8 =	34 - 7 =	33 - 8 =
17 - 9 =	16 - 9 =	13 - 7 =
27 - 9 =	26 - 9 =	23 - 7 =
37 - 9 =	36 - 9 =	33 - 7 =

**Subtract :**

31	33	37	36	35	32	34	38	39
7	5	8	9	6	4	7	9	9
33	35	36	32	31	37	34	36	35
8	7	7	5	9	9	8	8	7
17	33	25	24	36	26	27	29	21
8	9	7	8	7	8	8	10	9
18	24	27	31	19	32	35	37	34
9	9	9	6	9	5	6	10	6

**EXERCISE 41 (Written)**

Add:

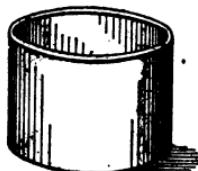
6	5	4	7	8	9	2	3	5	6	9
3	5	7	6	9	4	9	7	6	5	2
8	8	8	7	0	6	5	4	9	4	5
9	8	9	8	9	5	9	8	6	8	4
7	8	6	5	8	9	7	5	9	7	7

5	6	7	8	9	4	8	2	3	6	5
8	5	6	4	0	8	8	9	9	5	9
6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	5	5	5	5	4	4
<u>6</u>	<u>8</u>	<u>4</u>	<u>8</u>	<u>9</u>	<u>7</u>	<u>7</u>	<u>9</u>	<u>8</u>	<u>9</u>	<u>7</u>

Copy and complete :

$8+8+8+8=$	$9+9+9+9=$	$7+7+7+9=$
$8+8+8+9=$	$9+9+9+6=$	$5+9+9+5=$
$6+9+9+8=$	$9+6+8+9=$	$7+7+7+7=$
$8+8+7+7=$	$9+9+6+6=$	$7+9+7+9=$
$6+9+9+8=$	$9+9+7+7=$	$8+8+8+7=$
$9+8+9+8=$	$5+7+7+9=$	$7+6+7+9=$
$9+6+7+7=$	$8+8+9+9=$	$8+5+9+8=$
$3+9+8+6=$	$4+9+9+7=$	$5+8+9+8=$
$5+9+7+6=$	$7+5+9+4=$	$8+9+3+9=$
$9+9+2+8=$	$5+9+7+8=$	$4+9+9+9=$
$3+8+9+9=$	$9+4+9+8=$	$6+8+9+7=$

**EXERCISE 42 (Oral)**



BUSHEL



HALF-BUSHEL



PECK



QUART



PINT

2 pints (pt.) = 1 quart (qt.)

8 quarts = 1 peck (pk.)

4 pecks = 1 bushel (bu.)

1. How many pecks are in 2 bushels? How many pecks are in 3 bushels? How many pecks are in 4 bushels? How many pecks are in 5 bushels? How many pecks are in 6 bushels?
2. How many pecks are in  $\frac{1}{2}$  bu.? How many pk. are in  $\frac{1}{4}$  bu.? How many quarts are in 1 pk.? How many qt. are in 2 pk.? How many qt. are in 3 pk.? How many qt. are in 4 pk.? How many qt. are in  $\frac{1}{2}$  pk.? How many qt. are in a pk. and  $\frac{1}{2}$  pk.?
3. A boy bought 1 pk. and 2 qt. of pecans. How many qt. did he buy?
4. A boy bought 2 pk. and 3 qt. of pecans. How many qt. did he buy?
5. How many pt. are in 1 qt.? How many pt. are in 2 qt.? How many pt. are in 4 qt.? How many pints are in  $\frac{1}{2}$  peck? How many pints are in 8 qt.?
6. How many pints are in 1 peck? How many pints are in 1 quart and 1 pt.?
7. How many pints are in 1 quart and  $\frac{1}{2}$  quart? How many pints are in 2 quarts and  $\frac{1}{2}$  quart? How many  $\frac{1}{2}$  bu. are in 1 bu.? How many  $\frac{1}{2}$  bu. are in 1 bu. and  $\frac{1}{2}$  bu.?
8. How many quarts will it take to fill a two peck measure?
9. How many pints will fill a two peck measure?
10. Three quarts oats are taken out of a sack containing half a bushel. How many quarts are left?

11. Two pecks of corn are taken out of a sack containing two bushels. How many pecks remain in the sack?
12. A can contains sixteen quarts of pecans. Five quarts are sold. How many remain in the can?
13. A fruit vender has twelve quarts of peanuts. If he sells six pints, how many quarts has he left?
14. How many pecks are in sixteen quarts?
15. How many quarts are in twenty pints?
16. How many pecks are in twenty-four quarts?
17. Strawberries sell for five cents a quart. At this rate, how much will a peck of strawberries be worth?
18. When cherries sell for eight cents a quart, what will four quarts cost?
19. How many sacks, each containing one bushel, will be required to hold sixteen pecks?
20. How many sacks of wheat each containing two bushels, will be required to fill a bin holding twenty-eight bushels?
21. A quart of pecans sells for six cents. Find the cost of half a peck.
22. Find the cost of 1 bushel of potatoes, if 1 peck costs 25¢.
23. How many pints are 2 quarts and 1 pint?
24. How many pints are in 9 quarts and 1 pint?
25. How many qt. are in 2 pk. and 3 qt.?

## EXERCISE 43 (Oral)

How many are:

Three 2's and 1?	Four 8's and 2?	Seven 1's and 5?
Three 4's and 2?	Four 9's and 2?	Seven 2's and 1?
Three 5's and 1?	Five 1's and 3?	Seven 2's and 3?
Three 6's and 2?	Five 2's and 2?	Seven 2's and 6?
Three 7's and 1?	Five 3's and 2?	Seven 3's and 1?
Three 8's and 1?	Five 3's and 4?	Seven 3's and 4?
Three 9's and 2?	Five 4's and 3?	Seven 3's and 6?
Four 1's and 3?	Five 5's and 2?	Seven 4's and 1?
Four 2's and 3?	Five 5's and 4?	Seven 4's and 3?
Four 3's and 2?	Five 6's and 1?	Seven 4's and 5?
Four 4's and 3?	Five 6's and 4?	Seven 4's and 6?
Four 5's and 1?	Five 7's and 1?	Seven 5's and 1?
Four 6's and 3?	Five 7's and 3?	Seven 5's and 3?
Four 7's and 2?	Seven 1's and 3?	Seven 5's and 2?

1. How many 4's are in 11? *Ans.* There are two 4's and 3 over.
2. How many 2's are in 13? 15? 17? 19?
3. How many 3's are in 5? 8? 10? 13? 16? 19? 23? 25? 28? 29?
4. How many 4's are in 7? 9? 10? 13? 15? 17? 19? 21? 23? 26? 27? 29? 30? 31? 33? 35? 37?
5. How many 5's are in 7? 9? 11? 12? 14? 16? 18? 19? 21? 23? 24? 26? 28? 29? 31? 33? 37? 38? 39?
6. How many 6's are in 8? 11? 13? 15? 17? 16? 19? 20? 22? 23? 25? 27? 28? 31? 29? 33? 35? 37? 39?

7. How many 7's are in 10? 12? 13? 15? 17?  
 19? 16? 18? 20? 23? 25? 24? 26? 27? 29? 30?  
 31? 33? 34? 36? 38? 39?

8. How many 8's are in 11? 13? 15? 18? 19?  
 21? 23? 20? 25? 26? 27? 29?

**EXERCISE 44 (Written and Oral)**

Copy and complete:

$$\begin{array}{lllll}
 6 \times 4 = & 3 \times 9 = & 16 \div 4 = & 35 \div 5 = & 28 \div 7 = \\
 7 \times 3 = & 4 \times 8 = & 24 \div 4 = & 40 \div 5 = & 35 \div 7 = \\
 8 \times 2 = & 4 \times 9 = & 28 \div 4 = & 15 \div 5 = & 8 \div 8 = \\
 9 \times 1 = & 9 \times 3 = & 32 \div 4 = & 25 \div 5 = & 16 \div 8 = \\
 6 \times 5 = & 8 \times 4 = & 36 \div 4 = & 5 \div 5 = & 32 \div 8 = \\
 7 \times 4 = & 5 \times 4 = & 12 \div 3 = & 6 \div 6 = & 24 \div 8 = \\
 8 \times 3 = & 5 \times 5 = & 15 \div 3 = & 12 \div 6 = & 40 \div 8 = \\
 9 \times 2 = & 6 \times 6 = & 21 \div 3 = & 24 \div 6 = & 9 \div 9 = \\
 7 \times 5 = & 9 \times 4 = & 18 \div 3 = & 36 \div 6 = & 18 \div 9 = \\
 5 \times 7 = & 4 \times 4 = & 24 \div 3 = & 30 \div 6 = & 36 \div 9 = \\
 5 \times 6 = & 3 \times 3 = & 27 \div 3 = & 18 \div 6 = & 27 \div 9 = \\
 4 \times 7 = & 3 \times 7 = & 10 \div 5 = & 7 \div 7 = & 12 \div 4 = \\
 3 \times 8 = & 2 \times 10 = & 20 \div 5 = & 21 \div 7 = & 8 \div 4 = \\
 2 \times 9 = & 10 \times 2 = & 30 \div 5 = & 14 \div 7 = & 4 \div 4 =
 \end{array}$$

$$\begin{array}{l}
 12 \text{ inches (in.)} = 1 \text{ foot (ft.)} \\
 3 \text{ feet} \qquad \qquad = 1 \text{ yard (yd.)}
 \end{array}$$

1. How many inches are in 1 foot? How many in. are in 2 ft.? How many are in 3 ft? How many in. are in 1 yd.?

2. How many inches are in  $\frac{1}{2}$  foot? How many inches are in  $\frac{1}{3}$  of a foot? How many inches are in  $\frac{1}{4}$  of a foot?

3. How often is 6 inches contained in 1 yard ?  
 How often is 4 inches contained in 1 yard ? How often is 9 inches contained in 1 yard ?

4. How often is 1 foot contained in 1 yard ? How often is 12 inches contained in 1 yard ?

5. How many inches are in 1 foot and  $\frac{1}{2}$  of a foot ?

6. How many inches are in a rule which is 1 foot 3 inches long ?

7. How many inches are in 1 ft. 8 in. ? In 1 ft. and  $\frac{1}{3}$  of a ft. ? In 1 ft. and  $\frac{1}{4}$  of a ft. ?

8. How many inches are in a foot and a half ?

NOTE. The class should be provided with a yardstick.

Copy and complete :

$\frac{1}{2}$ of 12 inches =	$\frac{1}{4}$ of 16 inches =
$\frac{1}{3}$ of 12 inches =	$\frac{1}{4}$ of 28 inches =
$\frac{1}{4}$ of 12 inches =	$\frac{1}{4}$ of 36 inches =
$\frac{1}{2}$ of 20 inches =	$\frac{1}{3}$ of 27 inches =
$\frac{1}{2}$ of 18 inches =	$\frac{1}{3}$ of 9 inches =
$\frac{1}{3}$ of 18 inches =	$\frac{1}{3}$ of 15 inches =
$\frac{1}{2}$ of 24 inches =	$\frac{1}{2}$ of 14 inches =
$\frac{1}{3}$ of 24 inches =	$\frac{1}{2}$ of 10 inches =
$\frac{1}{4}$ of 24 inches =	$\frac{1}{3}$ of 33 inches =
$\frac{1}{4}$ of 20 inches =	$\frac{1}{4}$ of 32 inches =

#### EXERCISE 45 (Oral)

1. How many are :

39 and 1 ? 39 and 2 ? 39 and 3 ? 39 and 4 ?

39 and 5 ? 39 and 6 ? 39 and 7 ? 39 and 8 ?

39 and 9 ? 39 and 10 ?

**2.** How many are:

38 and 2? 38 and 3? 38 and 4? 38 and 5?

38 and 6? 38 and 7? 38 and 8? 38 and 9?

38 and 10?

**3.** How many are:

37 and 3? 37 and 4? 37 and 5? 37 and 6?

37 and 7? 37 and 8? 37 and 9? 37 and 10?

**4.** How many are:

36 and 4? 36 and 5? 36 and 6? 36 and 7?

36 and 8? 36 and 9? 36 and 10?

**5.** How many are:

35 and 5? 35 and 6? 35 and 7? 35 and 8?

35 and 9? 35 and 10?

**6.** How many are:

34 and 6? 34 and 7? 34 and 8? 34 and 9?

34 and 10?

**7.** How many are:

33 and 7? 33 and 8? 33 and 9? 33 and 10?

**8.** How many are:

32 and 8? 32 and 9? 32 and 10?

**9.** How many are:

31 and 9? 31 and 10?

**10.** How many are:

33 and 9? 35 and 9? 36 and 9? 31 and 8?

32 and 8? 36 and 7? 35 and 8? 35 and 7?

39 and 6? 38 and 8? 34 and 8? etc.

**NOTE TO TEACHERS.** Treat the numbers from 40 to 50, 50 to 60, 60 to 70, 70 to 80, 80 to 90, and 90 to 100 as has been done with numbers between 20 and 30 and 30 and 40.

**EXERCISE 46 (Oral)**

$$16 \text{ ounces (oz.)} = 1 \text{ pound (lb.)}$$

1. How many ounces are in one half of a pound ?
2. How many ounces are in  $\frac{1}{4}$  of a pound ?
3. What part of 1 lb. is 8 oz. ?
4. What part of 1 lb. is 4 oz. ?
5. How much will one and one half pounds of butter cost at 20¢ a pound ?
6. What will 5 lb. of rice cost at 6¢ a pound ?
7. What will 6 lb. of sugar cost at 5¢ a pound ?
8. Find the cost of 4 lb. nails at 7¢ a pound.
9. What will  $\frac{1}{2}$  lb. of coffee cost at 30¢ a pound ?
10. What will  $\frac{1}{2}$  lb. of tea cost at 50¢ a pound ?
11. What will  $\frac{1}{2}$  lb. of butter cost at 26¢ a pound ?
12. What will  $\frac{1}{2}$  bu. of oats weigh, if 1 bu. weighs 32 lb. ?
13. A bushel of wheat weighs 60 lb. What will  $\frac{1}{2}$  bu. weigh ?
14. How many 2-oz. packages can you make out of 1 lb. ?
15. How many 4-oz. packages can you make out of 1 lb. of butter ?
16. How many 8-oz. packages can be made out of 2 lb. of cheese ?
17. Find the cost of  $\frac{1}{2}$  lb. of seed at 2¢ an oz.

**EXERCISE 47 (Oral)**

100 cents (¢) = 1 dollar (\$).

1. How many cents equal one dime?
2. How many cents equal one nickel?
3. How many nickels equal one dime?
4. How many cents are equal in value to  $\frac{1}{2}$  of a dollar?
5. How many dimes are equal in value to  $\frac{1}{2}$  of a dollar?
6. How many cents are equal in value to one fourth of a dollar?
7. How many quarters are equal to a half dollar?
8. How many nickels are equal to a quarter of a dollar?
9. Name three coins together equal to a quarter.
10. Name two coins together equal to 15¢.
11. Name two coins together equal to one half dollar.
12. How can you make 35 cents in change with two coins?
13. How can you make 40 cents in change with three coins?
14. How can you make 75 cents in change with two coins?
15. How much car fare will a boy pay in one week to and from school, fare five cents?

**EXERCISE 48 (Oral)**

How many are:

1. 2 and 9 ?    2 and 19 ?    2 and 29 ?    2 and 39 ?  
 2 and 49 ?    2 and 59 ?    2 and 69 ?    2 and 79 ?  
 2 and 89 ?    2 and 99 ?
2. 3 and 9 ?    3 and 19 ?    3 and 29 ?    3 and 39 ?  
 3 and 49 ?    3 and 59 ?    3 and 69 ?    3 and 79 ?  
 3 and 89 ?    3 and 99 ?
3. 4 and 9 ?    4 and 19 ?    4 and 29 ?    4 and 39 ?  
 4 and 49 ?    4 and 59 ?    4 and 69 ?    4 and 79 ?  
 4 and 89 ?    4 and 99 ?
4. 5 and 9 ?    5 and 19 ?    5 and 29 ?    5 and 39 ?  
 5 and 49 ?    5 and 59 ?    5 and 69 ?    5 and 79 ?
5. 6 and 9 ?    6 and 19 ?    6 and 29 ?    6 and 39 ?  
 6 and 49 ?    6 and 59 ?    6 and 69 ?    6 and 79 ?  
 6 and 89 ?    6 and 99 ?
6. 7 and 9 ?    7 and 19 ?    7 and 29 ?    7 and 39 ?  
 7 and 49 ?    7 and 59 ?    7 and 69 ?    7 and 79 ?  
 7 and 89 ?    7 and 99 ?
7. 8 and 9 ?    8 and 19 ?    8 and 29 ?    8 and 39 ?  
 8 and 49 ?    8 and 59 ?    8 and 69 ?    8 and 79 ?
8. 9 and 9 ?    9 and 19 ?    9 and 29 ?    9 and 39 ?  
 9 and 49 ?    9 and 59 ?    9 and 69 ?    9 and 79 ?  
 9 and 89 ?    9 and 99 ?
9. 2 and 8 ?    2 and 18 ?    2 and 28 ?    2 and 38 ?  
 2 and 48 ?    2 and 58 ?    2 and 68 ?    2 and 78 ?  
 2 and 88 ?    2 and 98 ?

10. 3 and 8? 3 and 18? 3 and 28? 3 and 38?  
3 and 48? 3 and 58? 3 and 68? 3 and 78?  
3 and 88? 3 and 98?
11. 4 and 8? 4 and 18? 4 and 28? 4 and 38?  
4 and 48? 4 and 58? 4 and 68? 4 and 78?  
4 and 88? 4 and 98?
12. 5 and 8? 5 and 18? 5 and 28? 5 and 38?  
5 and 48? 5 and 58? 5 and 68? 5 and 78?  
5 and 88? 5 and 98?
13. 6 and 8? 6 and 18? 6 and 28? 6 and 38?  
6 and 48? 6 and 58? 6 and 68? 6 and 78?  
6 and 88? 6 and 98?
14. 7 and 8? 7 and 18? 7 and 28? 7 and 38?  
7 and 48? 7 and 58? 7 and 68? 7 and 78?  
7 and 88? 7 and 98?
15. 8 and 8? 8 and 18? 8 and 28? 8 and 38?  
8 and 48? 8 and 58? 8 and 68? 8 and 78?  
8 and 88? 8 and 98?
16. 9 and 8? 9 and 18? 9 and 28? 9 and 38?  
9 and 48? 9 and 58? 9 and 68? 9 and 78?
17. 6 and 6? 6 and 16? 6 and 36? 6 and 76?  
7 and 7? 7 and 17? 7 and 37? 7 and 87?  
8 and 7? 8 and 17? 8 and 47? 8 and 68?  
9 and 4? 9 and 24? 9 and 54? 9 and 74?  
9 and 7? 9 and 17? 9 and 37? 9 and 67?  
7 and 3? 7 and 13? 7 and 43? 7 and 93?  
7 and 5? 7 and 25? 7 and 55? 7 and 75?  
6 and 5? 6 and 35? 6 and 65? 6 and 85?

**EXERCISE 49 (Oral)**

1. Take 4 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
2. Take 6 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
3. Take 8 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
4. Take 9 from 10, 20, 30, 40, 50, 60, 70, 80, 90, 100.
5. Take 5 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
6. Take 7 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
7. Take 9 from 11, 21, 31, 41, 51, 61, 71, 81, 91, 101.
8. Take 2 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
9. Take 5 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
10. Take 7 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
11. Take 8 from 12, 22, 32, 42, 52, 62, 72, 82, 92, 102.
12. Take 4 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
13. Take 5 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
14. Take 6 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
15. Take 7 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
16. Take 8 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
17. Take 9 from 13, 23, 33, 43, 53, 63, 73, 83, 93, 103.
18. Take 5 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
19. Take 6 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
20. Take 7 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
21. Take 8 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
22. Take 9 from 14, 24, 34, 44, 54, 64, 74, 84, 94, 104.
23. Take 6 from 15, 25, 35, 45, 55, 65, 75, 85, 95, 105.
24. Take 7 from 15, 25, 35, 45, 55, 65, 75, 85, 95, 105.

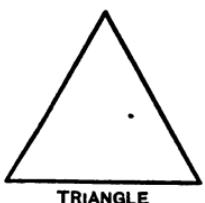
**EXERCISE 50 (Oral and Written)**

1. Count by 2's to 100.
2. Count by 2's to 100 beginning with 1, 3, 5.
3. Count by 3's to 100.
4. Count by 3's to 100 beginning with 1, 2.
5. Count by 4's to 100.
6. Count by 4's to 100 beginning with 1, 2, 3.
7. Count by 5's to 100.
8. Count by 5's to 100 beginning with 1, 2, 3, 4.
9. Count by 6's to 100.
10. Count by 6's to 100 beginning with 1, 2, 3, 4,  
5.
11. Count by 7's to 100.
12. Count by 7's to 100 beginning with 1, 2, 3, 4,  
5, 6.
13. Count by 8's to 100.
14. Count by 8's to 100 beginning with 1, 2, 3, 4,  
5, 6, 7.
15. Count by 9's to 100.
16. Count by 9's to 100 beginning with 1, 2, 3, 4,  
5, 6, 7, 8.
17. Count by 10's to 100.
18. Count by 10's to 100 beginning with 1, 2, 3, 4,  
5, 6, 7, 8, 9.

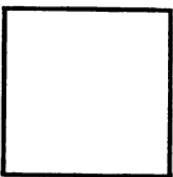
**NOTE.** This is one of the most important exercises in primary work in arithmetic. Pupils should be drilled in counting as above indicated until they have mastered it.

## MULTIPLICATION TABLE

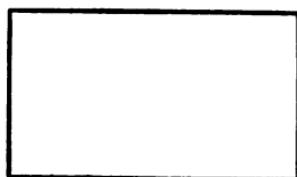
2	3	4	5
TIMES	TIMES	TIMES	TIMES
1 are 2	1 are 3	1 are 4	1 are 5
2 are 4	2 are 6	2 are 8	2 are 10
3 are 6	3 are 9	3 are 12	3 are 15
4 are 8	4 are 12	4 are 16	4 are 20
5 are 10	5 are 15	5 are 20	5 are 25
6 are 12	6 are 18	6 are 24	6 are 30
7 are 14	7 are 21	7 are 28	7 are 35
8 are 16	8 are 24	8 are 32	8 are 40
9 are 18	9 are 27	9 are 36	9 are 45
<hr/>			
6	7	8	9
TIMES	TIMES	TIMES	TIMES
1 are 6	1 are 7	1 are 8	1 are 9
2 are 12	2 are 14	2 are 16	2 are 18
3 are 18	3 are 21	3 are 24	3 are 27
4 are 24	4 are 28	4 are 32	4 are 36
5 are 30	5 are 35	5 are 40	5 are 45
6 are 36	6 are 42	6 are 48	6 are 54
7 are 42	7 are 49	7 are 56	7 are 63
8 are 48	8 are 56	8 are 64	8 are 72
9 are 54	9 are 63	9 are 72	9 are 81



TRIANGLE



SQUARE



RECTANGLE

**A triangle** is a plane figure bounded by three straight lines.

**A square** is a plane figure as long as it is wide.

**A rectangle** is a plane figure like a page of this book.

**A square inch** is a square having one inch for each side.

**A square foot** is a square having one foot for each side.

Draw a square having each side two inches long. Divide it into square inches. How many square inches does it contain?

Draw a square three inches on each side. How many square inches does it contain?

Draw a square four inches on each side. Divide it into square inches. How many square inches does it contain?

Draw a square five inches on each side. Divide it into square inches. How many square inches does it contain?

Draw a rectangle three inches by two inches. Divide it into square inches. How many square inches does it contain?

Draw a rectangle four inches by three inches. Divide it into square inches. How many square inches does it contain?

Draw a rectangle five inches by three inches. Divide it into square inches. How many square inches does it contain?

Draw a rectangle five inches by four inches. Divide it into square inches. How many square inches does it contain?

A rectangle is six inches by three inches. Find the length of its four sides.

A rectangle is seven inches by five inches. Find the length of its four sides.

A rectangle is eight inches by four inches. Find the length of its four sides.

A rectangle is nine inches by eight inches. Find the length of its four sides.

A square is seven feet on each side. How many square feet are in its surface? How many feet are in the length of its four sides?

A square is eight feet on each side. How many square feet are in its surface? Find the length of its four sides.

A square contains sixteen square inches. How long is one of its sides?

A square contains twenty-five square inches. How long is one of its sides?

A square contains eighty-one square inches. How long is one of its sides?

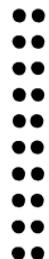
## PART II

### ADDITION

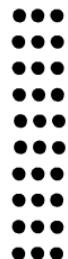
#### EXERCISE 1 (Written)

Add :

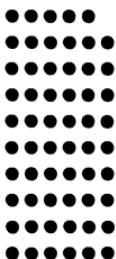
$$\begin{array}{r} 24 \\ 35 \\ \hline 59 \end{array}$$



+



=



24 +

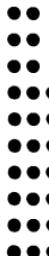
35 =

59

24 and 35 being too large to add mentally, we break up 24 into two parts, 2 tens and 4 ones and 35 into two parts, 3 tens and 5 ones; we then add the 5 ones and the 4 ones, and write the result, 9 ones. Next, add the 3 tens and the 2 tens and write the result, 5 tens.

Add :

$$\begin{array}{r} 27 \\ 36 \\ \hline 63 \end{array}$$



+



=



27 +

36 =

63

We again break up the numbers into tens and ones. 6 ones and 7 ones make 13 ones, or 1 ten and 3 ones. Write 3. 3 tens and 2 tens are 5 tens. 5 tens and 1 ten (the 1 ten from adding the ones) make 6 tens.

Add :

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
11	12	15	14	17	21	26	34	37
<u>21</u>	<u>27</u>	<u>32</u>	<u>42</u>	<u>52</u>	<u>63</u>	<u>62</u>	<u>53</u>	<u>61</u>
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
21	22	32	42	52	63	63	36	35
<u>34</u>	<u>32</u>	<u>24</u>	<u>26</u>	<u>31</u>	<u>32</u>	<u>12</u>	<u>21</u>	<u>51</u>
(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
25	47	49	38	74	82	75	24	29
<u>38</u>	<u>34</u>	<u>37</u>	<u>27</u>	<u>19</u>	<u>14</u>	<u>18</u>	<u>67</u>	<u>63</u>
(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
33	37	41	45	48	52	13	17	18
<u>59</u>	<u>55</u>	<u>49</u>	<u>47</u>	<u>39</u>	<u>38</u>	<u>34</u>	<u>27</u>	<u>24</u>
(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)
19	21	23	24	26	12	14	16	18
<u>22</u>	<u>35</u>	<u>38</u>	<u>29</u>	<u>37</u>	<u>34</u>	<u>29</u>	<u>27</u>	<u>26</u>
<u>37</u>	<u>36</u>	<u>37</u>	<u>28</u>	<u>19</u>	<u>37</u>	<u>40</u>	<u>50</u>	<u>25</u>
(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)
20	23	26	28	46	44	42	39	37
19	29	28	34	29	15	16	14	17
<u>18</u>	<u>31</u>	<u>44</u>	<u>39</u>	<u>28</u>	<u>27</u>	<u>26</u>	<u>19</u>	<u>34</u>

(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)
35	34	29	71	23	65	38	57
19	25	27	15	49	14	44	16
<u>38</u>	<u>29</u>	<u>32</u>	<u>12</u>	<u>17</u>	<u>20</u>	<u>16</u>	<u>21</u>

63. A man bought a book-case for \$26, a desk for \$18, and a chair for \$13. What was his bill?

64. A schoolboy bought a reader for 25¢, a spelling-book for 18¢, and an arithmetic for 20¢. What did the three books cost?

65. How much money will buy one peck of apples at 17¢ a peck, a dozen oranges at 35¢ a dozen, and a dozen lemons at 24¢ a dozen?

66. How much money will buy one pound of coffee at 28¢ a pound, five pounds of sugar for 24¢, and one pound of tea at 38¢?

67. A farmer has 29 tons of hay in one barn, 15 tons in another barn, and 16 tons in the field. How many tons of hay has the farmer?

**EXERCISE 2 (Written)**

1. $15 + 25 + 35 = ?$	9. $53 + 19 + 14 = ?$
2. $29 + 24 + 19 = ?$	10. $19 + 29 + 39 = ?$
3. $27 + 23 + 18 = ?$	11. $17 + 27 + 37 = ?$
4. $38 + 31 + 23 = ?$	12. $16 + 36 + 26 = ?$
5. $39 + 32 + 17 = ?$	13. $45 + 37 + 8 = ?$
6. $41 + 35 + 18 = ?$	14. $48 + 17 + 13 = ?$
7. $42 + 34 + 16 = ?$	15. $58 + 12 + 19 = ?$
8. $52 + 37 + 9 = ?$	16. $65 + 12 + 19 = ?$

17.  $41 + 19 + 32 = ?$       24.  $24 + 34 + 14 = ?$

18.  $51 + 18 + 13 = ?$       25.  $25 + 18 + 17 = ?$

19.  $35 + 29 + 23 = ?$       26.  $26 + 19 + 12 = ?$

20.  $37 + 28 + 19 = ?$       27.  $33 + 35 + 16 = ?$

21.  $36 + 27 + 18 = ?$       28.  $37 + 31 + 19 = ?$

22.  $24 + 26 + 28 = ?$       29.  $50 + 29 + 17 = ?$

23.  $17 + 27 + 37 = ?$       30.  $45 + 36 + 18 = ?$

31. A man pays \$24 a month for board, \$12 a month for room rent, and \$9 a month for other expenses. How much does he spend a month?

32. A man pays \$25 for a suit of clothes, \$4 for a pair of shoes, and \$18 for an overcoat. How much does he pay for the three articles?

33. A farmer plants 17 acres in corn, 27 acres in cotton, and 15 acres in wheat. How many acres does the farmer plant?

34. In a farm there are 24 acres in pasture, 15 acres in meadow, and 42 acres in corn. How many acres are in the farm?

35. A schoolgirl buys a language book for 35¢, a satchel for 20¢, and a knife for 35¢. What is her bill?

36. A man buys two milch cows for \$45 and \$42 respectively. What did he pay for both?

37. Three shelves of a book case have respectively 18, 24, and 29 books. How many books are on the three shelves?

38. Find the cost of 1 dozen eggs at 25¢ a dozen, 2 lb. of meat at 17¢ a pound, and a quart of ice cream at 30¢.

39. A room is 18 ft. by 14 ft. How many feet are there around the room?

40. A hall is 27 by 23 feet. How many feet are in its dimensions?

41. Three tubs of butter contain respectively 24, 29, and 37 pounds. How many pounds of butter are in the three tubs?

42. A boy reads in the morning 20 pages of a book, in the afternoon 17 pages, and in the evening 24. How many pages does he read?

43. A peck of potatoes costs 23¢. Find the cost of three pecks.

44. A side of a square is 17 ft. Find the length of the four sides.

45. A rectangular garden is 18 yd. by 15 yd. How many yd. are in its four sides?

46. A city lot is 14 by 32 yards. How many yards of fence will inclose it?

## NUMERATION AND NOTATION

## EXERCISE 3 (Oral and Written)

The next number after one hundred is one hundred one, then one hundred two, one hundred three, one hundred four, one hundred five, . . . one hundred

ten, one hundred eleven, one hundred twelve, . . .  
one hundred twenty, one hundred twenty-one, one hundred twenty-two, . . . one hundred thirty, one hundred thirty-one, one hundred thirty-two, . . . one hundred forty, . . . one hundred fifty, . . . one hundred sixty, . . . one hundred seventy, . . . one hundred eighty, . . . one hundred ninety, . . . two hundred, . . . three hundred, . . . four hundred, . . . five hundred, . . . six hundred, . . . seven hundred, . . . eight hundred, . . . nine hundred, . . . one thousand.

#### NOTATION

One hundred means 1 hundred, 0 tens, 0 ones, and is written 100.

Two hundred means 2 hundreds, 0 tens, 0 ones, and is written 200.

Three hundred means 3 hundreds, 0 tens, 0 ones, and is written 300.

Four hundred means 4 hundreds, 0 tens, 0 ones, and is written 400.

Five hundred means 5 hundreds, 0 tens, 0 ones, and is written 500.

Six hundred means 6 hundreds, 0 tens, 0 ones, and is written 600.

Seven hundred means 7 hundreds, 0 tens, 0 ones, and is written 700.

Eight hundred means 8 hundreds, 0 tens, 0 ones, and is written 800.

Nine hundred means 9 hundreds, 0 tens, 0 ones, and is written 900.

One thousand means 10 hundreds, 0 tens, 0 ones, and is written 1,000.

One hundred one means 1 hundred, 0 tens, 1 one, and is written 101.

One hundred two means 1 hundred, 0 tens, 2 ones, and is written 102.

One hundred ten means 1 hundred, 1 ten, 0 ones, and is written 110.

One hundred twenty means 1 hundred, 2 tens, 0 ones, and is written 120.

One hundred thirty means 1 hundred, 3 tens, 0 ones, and is written 130.

One hundred forty-eight means 1 hundred, 4 tens, 8 ones, and is written 148.

Two hundred twenty means 2 hundreds, 2 tens, 0 ones, and is written 220.

Two hundred fifty means 2 hundreds, 5 tens, 0 ones, and is written 250.

Two hundred sixty-three means 2 hundreds, 6 tens, 3 ones, and is written 263.

Three hundred sixty-one means 3 hundreds, 6 tens, 1 one, and is written 361.

Nine hundred ninety-nine means 9 hundreds, 9 tens, 9 ones, and is written 999.

Read :

108, 114, 119, 123, 129, 132, 133, 144, 156, 167, 172, 174, 179, 182, 185, 190, 199, 203, 204, 209, 210, 220, 270, 290, 222, 235, 239, 241, 245, 247,

256, 264, 274, 285, 303, 309, 306, 316, 330, 350,  
360, 380, 390, 382, 372, 352, 349, 401, 404, 444,  
414, 426, 434, 464, 475, 482, 499, 502, 503, 603,  
803, 904, 706, 607, 666, 555, 714, 728, 773, 815,  
818, 834, 836, 860, 880, 906, 919, 927, 963, 982,  
999, 1000, 2000, 3000, 7000, 8000, 1001, 1009, 1010,  
1040, 1090, 1097, 1100, 1200, 1300, 1600, 1800, 1122,  
1111, 1174, 1108, 1504, 1609, 1711, 1770, 1880, 1938,  
2483, 2406, 2309, 3207, 3021, 5005, 8008, 8010, 9104,  
7106, 6203, 8407, 9909, 9884, 3467, 1234, 4321, 2241,  
3214, 1432, 1423.

Express in figures :

One hundred six. One hundred fourteen. One hundred fifty. Two hundred ten. Two hundred twenty. Two hundred seventy-one. Three hundred eight. Three hundred twelve. Three hundred ninety-two. Four hundred twenty-five. Four hundred eighteen. Four hundred ninety. Four hundred eighty-five. Four hundred sixty-two. Five hundred nine. Five hundred eleven. Five hundred fifty-five. Five hundred ninety-five. Seven hundred three. Seven hundred thirteen. Seven hundred twelve. Seven hundred seventy-seven. Seven hundred fifty-one. Eight hundred one. Nine hundred two. Seven hundred five. Six hundred eight. Six hundred ten. Six hundred twenty. Seven hundred forty. Nine hundred seventy. Nine hundred seven. Seven hundred nine. Eight hundred eighty-eight. Nine hundred four. Nine hundred fourteen. Nine hundred forty. Nine hundred twenty-three. Nine hundred

ninety-two. Seven hundred sixty-eight. Seven hundred seven. One thousand two hundred thirty-one. One thousand three hundred. One thousand eight hundred. One thousand five hundred fifty.

**EXERCISE 4 (Oral)**

1. Count by 20's to 100. Count by 25's to 100.
2. Count by 30's to 120. Count by 40's to 120.
3. Count by 1000's to 10,000.
4. Count by 1000's from 10,000 to 100,000.
5. Count by 100's to 2,000.
6. Count by 50's to 1,000.
7. Count by 200's to 2,000.
8. Count by 300's to 2,100.
9. Count by 400's to 2,400.
10. Count by 600's to 3,000.
11. Count by 700's to 3,500.
12. Count by 800's to 4,000.
13. Count by 900's to 7,200.
14. 100 ft. of lumber cost \$3.50. Find the cost of 1,000 ft.
15. 100 staves are worth \$9.50. Find the value of 1000 staves.
16. 100 sheets of letter paper cost 32¢. Find the cost of 1,000 sheets.
17. 100 engraved cards cost 50¢. Find the cost of 300 cards.

18. 100 lb. of bran cost  $\$1\frac{1}{2}$ . Find the cost of 600 lb.

19. 100 lb. of feed meal cost  $\$1\frac{1}{4}$ . Find the cost of 800 lb.

20. 100 lb. cotton-seed hulls cost  $\$1\frac{1}{2}$ . Find the cost of 500 lb.

21. 100 lb. of cotton-seed meal cost  $\$1\frac{3}{4}$ . Find the cost of 800 lb.

22. 100 lb. of hops cost  $\$34\frac{1}{2}$ . Find the cost of 500 lb.

23. 100 lb. of flour cost  $\$5\frac{1}{4}$ . Find the cost of 700 lb.

### ADDITION

#### EXERCISE 5 (Written)

Add:

445      To add several numbers of two or more figures, first, we write the numbers so that the ones of each number are in the same vertical column, the tens of each number are in the same vertical column, and the hundreds of each number are in the same vertical column. Next, we add the ones; namely, in this example, 8, 2, 5. The sum is 15 ones, or 1 ten and 5 ones. Write the 5 ones in the column for ones. Next, we add the 6, 8, 4 tens, and the 1 ten obtained from adding the ones; the sum is 19 tens, or 1 hundred and 9 tens. Write the 9 in the tens' column. We next add the numbers in the hundreds' column and the 1 hundred from the addition of the

tens. 5, 7, 4, and 1 make 17. Write the 17 to the left of the tens. The sum is 1,795.

Add : (1)	(2)	(3)	(4)	(5)	(6)
232	447	438	524	417	318
429	208	809	410	326	421
<u>207</u>	<u>209</u>	<u>174</u>	<u>129</u>	<u>227</u>	<u>319</u>

7. A planter sells four bales of cotton whose weights are respectively 489 lb., 478 lb., 503 lb., and 512 lb. How many pounds of cotton does he sell?

8. The lengths of the four sides of a field are 572 yd., 329 yd., 568 yd., and 337 yd. How many yards are in the four sides of the field?

9. Three lots planted in wheat yield respectively 417, 499, 523 bu. How many bushels do the lots yield?

10. A ranchman has four flocks of sheep numbering respectively 234, 937, 357, and 523 sheep. How many sheep are in the four flocks?

11. The dimensions of a rectangle are 648 and 286 ft. How many feet are in the four sides of the rectangle?

12. A railroad system has 756 miles in one state, 386 miles in another, and 476 miles in a third. How many miles are in the system?

13. A drummer makes \$173 in January, \$148 in February, \$157 in March, and \$290 in April. How much does he make in the four months?

14. A jobber sells on four successive days 217, 275, 338, and 319 barrels of flour. Find his total sales.

(15)	(16)	(17)	(18)	(19)	(20)
144	273	225	432	738	904
327	903	429	418	568	321
<u>592</u>	<u>637</u>	<u>328</u>	<u>832</u>	<u>283</u>	<u>497</u>

(21)	(22)	(23)	(24)	(25)	(26)
334	473	368	429	937	828
543	845	467	594	275	456
<u>693</u>	<u>909</u>	<u>808</u>	<u>520</u>	<u>460</u>	<u>737</u>

27. A farmer sold three bales of cotton; the first bale weighed 478 pounds, the second bale, 492 pounds, and the third bale, 459 pounds. What did the three bales weigh?

28. A man owns three farms; one has 150 acres, the second has 218 acres, and the third, 129 acres. How many acres are in the three farms?

29. A man has three apple orchards. The first yields 265 barrels of apples, the second, 362 barrels, and the third, 286 barrels. How many barrels do the orchards yield?

#### EXERCISE 6 (Written)

Add:

(1)	(2)	(3)	(4)	(5)	(6)
429	583	213	576	392	273
538	604	902	776	235	940
790	794	584	628	806	294
<u>392</u>	<u>714</u>	<u>222</u>	<u>233</u>	<u>556</u>	<u>438</u>

(7)	(8)	(9)	(10)	(11)	(12)
524	537	592	604	609	519
683	297	348	792	456	654
853	728	518	809	706	904
<u>218</u>	<u>275</u>	<u>293</u>	<u>394</u>	<u>738</u>	<u>556</u>
(13)	(14)	(15)	(16)	(17)	(18)
714	727	739	763	774	792
619	692	638	647	658	509
234	432	342	567	456	765
<u>991</u>	<u>984</u>	<u>976</u>	<u>923</u>	<u>579</u>	<u>937</u>
(19)	(20)	(21)	(22)	(23)	(24)
528	532	539	547	555	564
493	484	475	469	628	486
693	538	835	706	607	705
<u>926</u>	<u>919</u>	<u>909</u>	<u>344</u>	<u>666</u>	<u>777</u>

25. A man travels on a train 310 miles the first day, 380 miles the second day, 285 miles the third day, and 219 miles the fourth day. How far does the man travel in the four days?

26. A dry goods merchant makes \$415 in January, \$257 in February, \$178 in March, and \$319 in April. How much does he make in the four months?

27. A commission merchant sells on Monday, 450 bales of cotton, on Tuesday, 273 bales, on Wednesday, 529 bales, and on Thursday, 93 bales. How many bales of cotton does the commission merchant sell in the four days?

**28.** A ranchman sold 379 head of cattle in October, 753 head in November, 432 head in December, and 600 head in January. How many head of cattle did the ranchman sell in the four months?

**EXERCISE 7 (Written)**

1.  $218 + 94 + 462 + 219 + 173 = ?$
2.  $725 + 409 + 93 + 797 + 8 = ?$
3.  $523 + 514 + 96 + 798 + 90 = ?$
4.  $937 + 846 + 394 + 97 + 108 = ?$
5.  $456 + 653 + 900 + 278 + 19 = ?$
6.  $917 + 418 + 696 + 84 + 17 = ?$
7.  $276 + 467 + 509 + 59 + 28 = ?$
8.  $218 + 337 + 744 + 538 + 927 = ?$
9.  $963 + 217 + 345 + 99 + 29 = ?$
10.  $804 + 593 + 392 + 57 + 16 = ?$
11.  $29 + 97 + 173 + 178 + 589 = ?$
12.  $79 + 478 + 384 + 67 + 26 = ?$
13.  $9 + 89 + 294 + 938 + 517 = ?$
14.  $11 + 111 + 929 + 528 + 76 = ?$
15.  $38 + 691 + 14 + 140 + 798 = ?$
16.  $37 + 77 + 519 + 694 + 93 = ?$
17.  $25 + 95 + 98 + 508 + 909 = ?$
18.  $605 + 77 + 99 + 430 + 590 = ?$
19.  $659 + 924 + 494 + 56 + 65 = ?$
20.  $76 + 499 + 808 + 888 + 777 = ?$
21.  $75 + 192 + 196 + 978 + 16 = ?$
22.  $88 + 666 + 593 + 279 + 429 = ?$

23. There are three bookcases in my library. In one there are 297 volumes, in another 129, and in the third 174. How many books are in the three bookcases?

24. A coal merchant sold in four successive weeks 299 tons of coal, 318 tons, 548 tons, and 629 tons. How many tons of coal did he sell?

**EXERCISE 8 (Oral and Written)**

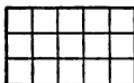


FIG. 1

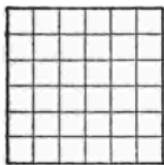


FIG. 2

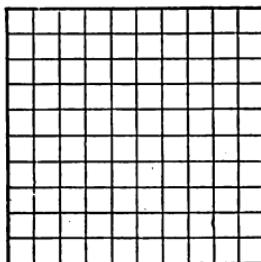


FIG. 3

1. Count the squares in the first horizontal row of Figure 1.
2. How many horizontal rows are in Figure 1?
3. How many squares are in Figure 1?
4. What part of Figure 1 is its first horizontal row of squares?
5. What part of 15 is 5?

6. What part of Figure 1 is its two first horizontal rows?
7.  $\frac{2}{3}$  of 15 is what number?
8. How many squares are in each vertical row of Figure 1?
9. How many vertical rows are in Figure 1?
10. What part of 15 is 3?
11.  $\frac{1}{5}$  of what number is 3?
12. What is  $\frac{1}{5}$  of 15? What is  $\frac{2}{5}$  of 15?
13. What is  $\frac{3}{5}$  of 15? What is  $\frac{4}{5}$  of 15?
14. How many squares are in Figure 2?
15. How many horizontal rows are in Figure 2?
16. How many vertical rows are in Figure 2?
17. How many squares are in a horizontal row of Figure 2?
18. How many squares are in half of Figure 2?
19. What part of Figure 2 is each of its horizontal rows?
20. What is  $\frac{1}{6}$  of 36? What is  $\frac{2}{6}$  of 36?
21. What is  $\frac{1}{3}$  of 36? How does  $\frac{1}{3}$  of a number compare with  $\frac{2}{6}$  of the same number?
22. What is  $\frac{3}{6}$  of 36? What is  $\frac{1}{2}$  of 36?
23. How does  $\frac{1}{2}$  of a number compare with  $\frac{3}{6}$  of the same number?
24. How do  $\frac{4}{6}$  of a number and  $\frac{2}{3}$  of the same number compare?

25. What is  $\frac{4}{6}$  of 36? What is  $\frac{2}{3}$  of 36? What is  $\frac{5}{6}$  of 36?

26. Give the number of which 2 is  $\frac{1}{6}$ ; of which 3 is  $\frac{1}{6}$ .

27. Give the number of which 5 is  $\frac{1}{6}$ ; of which 7 is  $\frac{1}{6}$ .

28. 6 is  $\frac{1}{2}$  of what number?  $\frac{1}{3}$  of what number?  
 $\frac{1}{4}$  of what number?

29. 6 is  $\frac{1}{5}$  of what number?  $\frac{1}{6}$  of what number?

30. How many inches are in  $\frac{1}{4}$  of a foot?

31. How many inches are in  $\frac{2}{4}$  of a foot?

32. How many inches are  $\frac{3}{4}$  of a foot?

33. 4 inches are what part of 1 foot?

34. 6 inches are what part of 1 foot?

35. How many squares are in the first horizontal row of Figure 3?

36. How many rows of squares are in Figure 3?

37. What part of Figure 3 is its first horizontal row?

38. What is  $\frac{1}{10}$  of 100? What is  $\frac{2}{10}$  of 100?

39. What is  $\frac{1}{5}$  of 100? Which is larger,  $\frac{2}{10}$  or  $\frac{1}{5}$ ?

40. What is  $\frac{3}{10}$  of 100? What is  $\frac{4}{10}$  of 100?

41. What part of \$1 is 25¢? What part of \$1 is 50¢?

42.  $\frac{1}{3}$  of 15 = ?       $\frac{2}{3}$  of 12 = ?       $\frac{1}{3}$  of 12 = ?

43.  $\frac{2}{3}$  of 12 = ?       $\frac{1}{4}$  of 36 = ?       $\frac{3}{4}$  of 36 = ?

**44.** A cornfield is 328 yards long and 279 yards wide. If a man plows a furrow around the field, what will be the length of the furrow?

**45.** A public hall is 157 feet long and 94 feet wide. What is the distance in feet around the hall?

**46.** A park in the shape of a rectangle is 752 feet long and 638 feet wide. What is the distance in feet around the park?

**47.** One side of a square farm is 440 yards. What is the distance in yards around the farm?

**48.** If one side of a square is 850 yards, how many yards are in the four sides?

**49.** The length of a rectangle is 479 yards and its width 428 yards. How many yards are in its sides?

**50.** A field in the shape of a rectangle is 978 yards long and 876 yards wide. How many yards are in its four sides?

#### REVIEW

##### **EXERCISE 9 (Written or Oral)**

**1.** A milkman has 72 qt. of milk. How many gallons has he?

**2.** A family takes a pint of milk every morning and evening during the month of June. Find the cost of the milk at 4¢ a pint.

**3.** At 15¢ a peck, how much will a bushel of potatoes cost?

4. How much will a peck of peanuts cost at 5¢ a pint?
5. James picked 37 qt. of cherries, and received 2¢ a qt. for picking them. How much did he receive for his work?
6. Three bushels of apples are picked from a tree. How much are they worth at 75¢ a bushel?
7. A fruit dealer sold 5 bu. of peaches. How many pk. did he sell? How much did he get for them at 40¢ a pk.?
8. Out of a barrel containing  $2\frac{1}{2}$  bu. of apples, 5 pk. are sold. How many pk. remained in the barrel?
9. Find the cost of 7 pk. and 3 qt. of beans at 5¢ a qt.
10. Find the cost of 4 oz. of hops at 36¢ a lb.
11. Find the cost of  $\frac{1}{4}$  of a lb. of butter at 24¢ a lb.
12. Find the cost of  $\frac{3}{4}$  of a yd. of silk at 80¢ a yd.
13. Find the cost of  $2\frac{1}{2}$  yd. of calico at 8¢ a yd.
14. How much will a bricklayer earn in 6 hours at 50¢ an hour?
15. Henry walks  $2\frac{1}{2}$  miles an hour. At this rate, how far will he walk in 4 hours?
16. How many minutes are in 3 hr.?
17. How many min. are in  $\frac{1}{4}$  of an hour?
18. How many minutes are in  $\frac{3}{4}$  of an hour?
19. How many min. are in  $\frac{1}{3}$  of an hr.?

20. How many min. are in  $\frac{2}{3}$  of an hr. ?
21. How many hr. are in  $\frac{1}{2}$  of a day ?
22. How many hr. are in  $\frac{1}{3}$  of a da. ?
23. How many hr. are in  $\frac{2}{3}$  of a da. ?
24. How many hr. are in  $\frac{1}{4}$  of a da. ?
25. How many hr. are in  $\frac{3}{4}$  of a da. ?
26. How many min. are in  $\frac{1}{6}$  of an hr. ?
27. How many min. are in  $\frac{5}{6}$  of an hr. ?
28. How many days are in  $\frac{1}{2}$  of the month of June ?
29. Jane is 20 years old. What is  $\frac{3}{4}$  of her age ?
30. Robert is 12 years old. How many years is  $\frac{2}{3}$  of his age ?
31. How many square yards are in a garden 10 yd. by 5 yd. ?
32. How many square yards are in a plot of ground 9 yd. by 7 yd. ?
33. How many square yards are in a square whose side is 8 yd. ?
34. How many square yards are in a square whose side is 9 yd. ?
35. A carpenter earns \$  $3\frac{1}{2}$  a day. How much will he earn in a week of six days ?
36. A day laborer earns \$ 2 a day. How much will he earn in  $4\frac{1}{2}$  days ?
37. A bale of cotton sells for \$ 49. What would three such bales bring ?

## ROMAN NOTATION

## ROMAN AND ARABIC NUMERALS

	<b>ROMAN</b>	<b>ARABIC</b>		<b>ROMAN</b>	<b>ARABIC</b>
One	I	1	Twenty	XX	20
Two	II	2	Thirty	XXX	30
Three	III	3	Forty	XL	40
Four	IV	4	Fifty	L	50
Five	V	5	Sixty	LX	60
Six	VI	6	Seventy	LXX	70
Seven	VII	7	Eighty	LXXX	80
Eight	VIII	8	Ninety	XC	90
Nine	IX	9	One Hundred	C	100
Ten	X	10	Two Hundred	CC	200
Eleven	XI	11	Three Hundred	CCC	300
Twelve	XII	12	Four Hundred	CCCC or	
Thirteen	XIII	13		CD	400
Fourteen	XIV	14	Five Hundred	D	500
Fifteen	XV	15	Six Hundred	DC	600
Sixteen	XVI	16	Seven Hundred	DCC	700
Seventeen	XVII	17	Eight Hundred	DCCC	800
Eighteen	XVIII	18	Nine Hundred	CM	900
Nineteen	XIX	19	One Thousand	M	1000

A horizontal line written above a character multiplies its value by one thousand. For example, V stands for 5000. The Roman Notation is of very little practical consequence. It is used in numbering chapters of books, indicating time on clocks and watches, marking time on monuments, etc. Numbers above 2000 are rarely ever expressed in the Roman Notation.

Numbers in the Roman system are expressed by

combining the symbols of the above Roman Numerals. To express a number in the Roman Notation, select from the above symbols that one which stands for the number nearest to the given number. Treat the remainder in the same manner, and so on. To illustrate: Take the number 1907. In the above list there is a symbol for 1000, also one for 900, and one for 7. Combining these, we have MCMVII, which is the Roman method of writing 1907.

Express in the Roman Notation :

Twenty-four; thirty-seven; forty-six; fifty-nine; sixty-eight; seventy-five; eighty-three; eighty-nine; ninety-nine; one hundred fifteen; one hundred nineteen; one hundred twenty-nine; one hundred forty-seven; two hundred ninety-eight; three hundred fifty-six; four hundred thirty-eight; eight hundred ninety-two.

#### NUMERATION AND NOTATION

Take a number, for example, 1,783. This number consists of four figures; the figure on the right, 3, stands for 3 ones, or 3 units, the next figure to the left, 8, stands for 8 tens, the next figure to the left, 7, stands for 7 hundreds, the figure to the left of hundreds, 1, stands for 1 thousand. Every other number of four figures has its units' figure, its tens' figure, its hundreds' figure, and its thousands' figure. The units' figure is said to occupy the units' place in the number. The tens' figure is said to occupy the tens'

place, the hundreds' figure is said to occupy the hundreds' place, and the thousands' figure is said to occupy the thousands' place.

3 in the units' place stands for 3 ones, or 3 units. 3 in the next place to the left stands for ten times as much as the 3 in the units' place. 3 in the next place to the left, that is the hundreds' place, stands for ten times as much as 3 in the tens' place. 3 in the next place to the left, that is the thousands' place, stands for ten times as much as 3 in the hundreds' place. If we write another 3 to the left, this 3 will stand for ten times as much as the 3 in the thousands' place. If we write still another 3 to the left of this last 3, its value will be ten times greater than the 3 to its immediate right, and so on.

5 millions , 5 hundred-thousands  
5 ten-thousands 5 thousands , 5 hundreds  
5 tens 5 units

This number is read five million five hundred fifty-five thousand five hundred fifty-five.

To read a number of more than three figures, we divide the figures of the number into periods of three figures each, beginning at the right. The first period to the right is called the units' period, the next period is called the thousands' period, and the next period is called the millions' period.

*Example 1.* Read 17494. To read this number we divide it into periods. Doing so, we have

17,494.

This is read seventeen thousand four hundred ninety-four.

*Example 2.* Read 309208. Dividing as before into periods, we have

309,208.

This number is read three hundred nine thousand two hundred eight.

#### EXERCISE 10 (Oral)

Read:

1. 4905; 7824; 6060; 5409; 3201; 4015; 5100; 6064; 6078; 6004.
2. 11493; 20608; 30209; 50068; 61072; 68091; 79003; 80005.
3. 124276; 178908; 219067; 300293; 400729; 500708; 900505.
4. 984003; 780010; 650050; 540090; 501001; 702003; 900009.

Express in figures:

5. Two thousand three hundred sixty. Four thousand four hundred sixty-one. Five thousand one hundred three. Five thousand ten. Six thousand twenty. Seven thousand twenty-four. Eight thousand one hundred eleven. Nine thousand eleven. Four thousand four. Five thousand six. Nine thou-

sand three. Four thousand one. Two thousand two. Seven thousand nine. Nine thousand seven. Ten thousand four hundred twenty-three. Twelve thousand five hundred. Seventeen thousand eight hundred. Nineteen thousand nineteen. Twenty thousand two hundred one.

6. Twenty-five thousand seven hundred ninety-three. Fifty thousand fifty. Sixty thousand sixty. Seventy thousand eighty. Forty thousand ninety. Ninety thousand eleven. Eighty thousand three hundred six. Thirty thousand ten.

7. One hundred one thousand four hundred twenty-four. One hundred nine thousand one hundred nine. Two hundred eight thousand four hundred fifty. Seven hundred fifty thousand fifty-one. Eight hundred twenty-six thousand sixty-one. Nine hundred ten thousand ten. Nine hundred eight thousand five. Two hundred six thousand six. Three hundred thousand three. Four hundred thousand four. Nine hundred thousand one. Two hundred fifty thousand fifty.

#### EXERCISE 11 (Written)

Add:

(1)	(2)	(3)	(4)	(5)	(6)
4,298	5,460	1,235	7,890	9,460	6,712
8,339	5,173	6,337	8,969	7,010	9,217
6,038	9,997	7,893	4,567	7,643	4,673
8,865	9,683	7,788	8,778	5,566	9,992
<u>9,463</u>	<u>4,927</u>	<u>3,895</u>	<u>9,096</u>	<u>7,788</u>	<u>6,666</u>

(7)	(8)	(9)	(10)	(11)	(12)
6,333	8,442	392	7,909	7,389	2,299
2,078	1,859	1,428	4,617	5,351	6,874
7,398	7,662	9,293	9,853	2,771	9,960
7,986	7,597	6,826	5,683	4,559	3,819
<u>2,364</u>	<u>1,648</u>	<u>1,294</u>	<u>9,894</u>	<u>9,207</u>	<u>9,866</u>

(13)	(14)	(15)	(16)	(17)	(18)
1,072	4,328	6,307	7,609	7,876	8,687
9,516	9,796	9,936	2,365	4,185	4,908
5,901	7,716	7,983	8,252	8,523	8,796
9,349	9,628	9,909	1,934	4,649	4,964
5,281	5,921	6,244	6,569	6,896	7,556
7,889	8,224	8,561	7,089	7,524	7,961
<u>9,729</u>	<u>1,984</u>	<u>2,441</u>	<u>3,864</u>	<u>4,298</u>	<u>4,756</u>

(19)	(20)	(21)	(22)	(23)	(24)
80,818	85,648	90,499	95,369	20,012	76,007
81,218	86,448	91,699	96,969	12,891	23,567
39,844	45,294	50,785	56,255	61,766	67,296
72,847	78,417	84,008	89,619	95,249	35,213
46,815	52,645	58,495	64,366	70,257	76,167
82,098	88,048	94,019	42,624	47,704	52,805
57,925	63,066	68,226	78,607	83,828	89,068
<u>99,600</u>	<u>64,526</u>	<u>75,627</u>	<u>92,429</u>	<u>98,069</u>	<u>49,725</u>

25. How far will a man walk in going around a rectangular tract of land 3,584 yards long and 1,768 yards wide?

26. How many pounds are in four loads of coal which weigh 6,680 pounds, 6,950 pounds, 7,290 pounds and 5,478 pounds?

27. A grain merchant sells on Monday 2,578 bushels of wheat; on Tuesday, 7,950 bushels; on Wednesday, 6,419 bushels; and on Thursday, 8,907 bushels. How many bushels does he sell in all?

**EXERCISE 12 (Written)**

1.  $9696 + 9749 + 1556 + 1717 + 2792 + 2846 = ?$
2.  $7284 + 7618 + 7674 + 7729 + 8288 + 8849 = ?$
3.  $5849 + 6436 + 7025 + 7616 + 8209 + 8804 = ?$
4.  $3958 + 4465 + 4974 + 5485 + 5998 + 6512 = ?$
5.  $7548 + 8069 + 8592 + 9216 + 9643 + 2307 = ?$
6.  $3387 + 4474 + 5021 + 570 + 2674 + 7228 = ?$
7.  $9468 + 1739 + 2312 + 2886 + 3463 + 4623 = ?$
8.  $6377 + 8744 + 9341 + 9940 + 876 + 4249 = ?$
9.  $5481 + 7969 + 8596 + 9225 + 4329 + 6276 = ?$
10.  $2896 + 3569 + 4921 + 9716 + 3697 + 5543 = ?$
11.  $6783 + 7406 + 9288 + 3748 + 4394 + 6364 = ?$
12.  $2963 + 3636 + 4798 + 5668 + 7718 + 8405 = ?$
13.  $6659 + 7282 + 7906 + 9739 + 2336 + 4911 = ?$
14. William Dragoo bought five tracts of land for a ranch which tracts contained 3,275 acres, 968 acres, 1,728 acres, 3,425 acres, and 840 acres. How many acres are in his ranch?
15. A merchant's receipts for one week were, on Monday, \$892; on Tuesday, \$1,288; on Wednesday, \$1,548; on Thursday, \$887; on Friday, \$954; and

on Saturday, \$1,889. What were his receipts for the week?

16. In a certain city there are five schools; the first has 978 pupils; the second, 864; the third, 1,194; the fourth, 758; and the fifth, 967. What is the total number of children in the five schools?

17. There are six wards in a certain city. The population of the first ward is 7,294; of the second ward, 6,590; of the third ward, 5,428; of the fourth ward, 6,696; of the fifth ward, 7,182; and of the sixth ward, 4,997. Find the population of the city.

### SUBTRACTION

If a boy has \$7 and spends \$3, how many dollars has he left? How many dollars must be added to \$3 to make \$7?

If a farmer has 12 cows and sells 5, how many cows does the farmer then have? How many cows must be added to 5 cows to make 12 cows?

From a can containing 10 gallons of oil 4 gallons of oil are drawn out. How many gallons of oil remain in the can? If a 10-gallon can has in it 4 gallons of oil, how many more gallons of oil must be put into the can to fill it?

(1)	(2)	(3)
\$ 7 minuend	12 cows, minuend	10 gallons, minuend
\$ 3 subtrahend	5 cows, subtrahend	4 gallons, subtrahend
\$ <u>4</u> remainder	<u>7</u> cows, remainder	<u>6</u> gallons, remainder

In example (1) the minuend is \$7, the subtrahend is \$3, and the remainder is \$4. In example (2) the

minuend is 12 cows, the subtrahend is 5 cows, and the remainder is 7 cows. In example (3) the minuend is 10 gallons, the subtrahend is 4 gallons, and the remainder is 6 gallons.

Another name for remainder is difference.

What is the sum of the remainder and the subtrahend in each of the above examples? In an exercise in subtraction what is the sum of the remainder and the subtrahend always equal to?

$47 - 24 = ?$  The numbers being too large to subtract mentally, we break them up into parts shown by the values of the figures in each; namely, 4 tens and 7 ones; 2 tens and 4 ones. 4 ones and 3 ones make 7 ones. Write 3 in the column for ones in the remainder. 2 tens and 2 tens make 4 tens. Write 2 in the tens' column of the remainder. The answer is 23.

### EXERCISE 13 (Written)

Subtract:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
29	27	38	35	57	44	49	69	75
16	12	11	21	20	30	22	35	41
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
70	58	67	76	83	95	66	88	94
20	28	37	25	61	32	43	54	82

(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
369	485	658	907	690	734	929	508	805
124	231	414	302	230	612	910	402	103
(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
2975	5734	6939	4680	5478	3807	9208	8406	7738
2431	3512	5907	4650	2251	1402	5207	4401	6306

37. The population of Manchester, New Hampshire, was, in 1900, 56,987, and in 1890 the population was 44,126. Find the gain in population in the ten years.

38. The census of 1900 gives Tampa, Florida, 15,839 inhabitants. The census of 1890 gives Tampa 5,532. Find the increase in population.

39. In 1890 Sitka, Alaska, had a population of 1,190, and in 1900 it had a population of 1,396. Find the gain in population in the ten years.

40. Wheeling, West Virginia, had a population, in 1890, of 34,522, and in 1900 a population of 38,878. Find the gain in population.

41. The length of the Amazon River is 3,300 miles and the length of the St. Lawrence is 2,200 miles. How many miles longer is the Amazon than the St. Lawrence?

42. Mt. Whitney is 14,898 feet high. Mt. Shasta is 14,380 feet high. How many feet higher is Mt. Whitney than Mt. Shasta?

43. Mt. McKinley is 20,464 feet high and Mt. Washington is 6,293 feet high. How many feet higher is Mt. McKinley than Mt. Washington?

In order to understand how we work an example in subtraction, we will first work an example in addition.

Add:

$$\begin{array}{r}
 7,498 \\
 4,354 \\
 \hline
 11,852
 \end{array}$$
 4 and 8 are 12. Write 2 and carry 1.  
 1 and 5 are 6; 6 and 9 are 15. Write 5  
 and carry 1. 1 and 3 are 4; 4 and 4 are  
 8. Write 8. 7 and 4 are 11. Write 11.

The answer is 11,852.

From 11,852 take 4,354.

$$\begin{array}{r}
 11,852 \\
 4,354 \\
 \hline
 7,498
 \end{array}$$
 Here we have to find a number which  
 if added to 4,354 will give 11,852.  
 for sum. 4 and 8 are 12. Write 8,  
 carry 1. 1 and 5 are 6; 6 and 9 are 15.

Write 9, carry 1. 1 and 3 are 4; 4 and 4 are 8.  
 Write 4. 4 and 7 are 11. Write 7. The answer is  
 7,498.

#### EXERCISE 14 (Written)

Subtract:

$$\begin{array}{r}
 (1) \quad (2) \quad (3) \quad (4) \quad (5) \quad (6) \quad (7) \quad (8) \quad (9) \quad (10) \\
 31 \quad 42 \quad 54 \quad 65 \quad 71 \quad 80 \quad 77 \quad 90 \quad 63 \quad 36 \\
 \hline
 17 \quad 13 \quad 26 \quad 28 \quad 37 \quad 41 \quad 48 \quad 9 \quad 19 \quad 18
 \end{array}$$

$$\begin{array}{r}
 (11) \quad (12) \quad (13) \quad (14) \quad (15) \quad (16) \quad (17) \quad (18) \quad (19) \quad (20) \\
 237 \quad 323 \quad 405 \quad 709 \quad 924 \quad 555 \quad 328 \quad 765 \quad 631 \quad 933 \\
 \hline
 129 \quad 219 \quad 207 \quad 310 \quad 229 \quad 456 \quad 174 \quad 368 \quad 235 \quad 176
 \end{array}$$

$$\begin{array}{r}
 (21) \quad (22) \quad (23) \quad (24) \quad (25) \quad (26) \\
 5,208 \quad 7,939 \quad 5,322 \quad 9,211 \quad 8,200 \quad 9,400 \\
 \hline
 2,209 \quad 5,245 \quad 3,119 \quad 1,728 \quad 4,111 \quad 6,403
 \end{array}$$

(27)	(28)	(29)	(30)	(31)	(32)
8,209	7,103	9,205	5,223	9,403	7,938
5,301	1,294	2,298	1,325	4,594	7,739
<u>(33)</u>	<u>(34)</u>	<u>(35)</u>	<u>(36)</u>	<u>(37)</u>	<u>(38)</u>
9,444	6,807	50,000	27,403	39,204	17,307
<u>2,547</u>	<u>1,499</u>	<u>21,201</u>	<u>9,605</u>	<u>9,109</u>	<u>4,408</u>
	(39)	(40)	(41)		
	26,845	53,103	100,000		
	15,856	12,999	297		

42. The population of Dallas, Texas, in 1900 was 42,638, and in 1890 its population was 38,067. Find the increase in the ten years.

43. In 1900, the population of Harrisburg, Pennsylvania, was 50,167, and in 1890 its population was 39,385. Find the gain in population.

44. Hartford, Connecticut, had a population of 79,850 in 1900, and a population of 53,230 in 1890. Find the gain in population.

45. Annapolis, Maryland, in 1890, had a population of 7,604, and in 1900, 8,402. Find the increase in population.

46. Pikes Peak is 14,108 feet high and Fremont Peak is 13,790 feet high. How many feet higher is Pikes Peak than Fremont Peak?

47. Maryland contains 12,210 square miles and New Jersey contains 7,815 square miles. How much larger is Maryland than New Jersey?

48. Ohio contains 41,060 square miles and South Carolina contains 30,570 square miles. How much larger is Ohio than South Carolina?

49. The area of Texas is 265,780 square miles and the area of New York is 49,170 square miles. How many more square miles does Texas contain than New York?

**EXERCISE 15 (Written)**

1.  $3,294 - 1,718 = ?$

11.  $7,169 - 2,858 = ?$

2.  $6,917 - 828 = ?$

12.  $6,118 - 4,927 = ?$

3.  $5,264 - 2,893 = ?$

13.  $4,702 - 2,713 = ?$

4.  $4,165 - 1,828 = ?$

14.  $5,888 - 1,999 = ?$

5.  $4,054 - 1,815 = ?$

15.  $5,567 - 3,994 = ?$

6.  $9,189 - 6,803 = ?$

16.  $5,486 - 869 = ?$

7.  $7,803 - 6,788 = ?$

17.  $9,430 - 6,995 = ?$

8.  $5,672 - 4,275 = ?$

18.  $6,008 - 29 = ?$

9.  $6,079 - 4,084 = ?$

19.  $1,001 - 14 = ?$

10.  $7,075 - 6,766 = ?$

20.  $5,005 - 49 = ?$

21. A man has \$1,000 in bank ; he owes two debts, one of \$350, the other of \$273. After paying both debts, how many dollars will he have in bank ?

22. Mr. Henry Thomas owns a house and lot worth \$2,700, a farm worth \$1,800 ; and he owes \$570. How much is Mr. Thomas worth after paying his debts ?

23. A man bought two suits of clothes ; one suit cost \$12, the other \$15. He gave in payment a hundred dollar bill. How much change had he returned to him ?

24. A man bought a house and lot for \$3,500, and two months later sold it for \$4,278. How much did he make by the transaction?

25. A clerk gets a salary of \$75 a month; he spends \$18 a month for board, \$8 a month for room rent, \$12 a month for other expenses, and he saves the remainder of his salary. How much does he save a month?

26. A newsboy has \$23 in bank. How much must he add to it to make \$100?

27. The population of Philadelphia, in 1900, was 1,293,697. The population of Cincinnati, the same year, was 325,902, and of Buffalo, 352,387. How many more people were in Philadelphia than in Cincinnati and Buffalo combined?

### MULTIPLICATION

$289 \times 5 = ?$  We may work this example by addition as follows:

$$\begin{array}{r}
 289 \\
 289 \\
 289 \\
 289 \\
 \hline
 1445
 \end{array}$$

We may shorten this work as follows:

$$\begin{array}{r}
 289 \\
 \times 5 \\
 \hline
 1445
 \end{array}$$

5 nines are 45. Write 5, carry 4. 5 eights are 40. 40 and 4 are 44. Write 4, carry 4. 5 twos are 10. 10 and 4 are 14. Write 14. The answer is 1,445.

The number to be repeated is called the **multiplicand**.

The number which shows how many times the multiplicand is to be repeated is called the **multiplier**.

The result of multiplying one number by another is called the **product**.

**Multiplication** is a short method of addition when the numbers to be added are the same.

#### EXERCISE 16 (Written)

Multiply :

1. 24 by 2, by 4, by 6, by 8.	9. 185 by 5, 7, 9.
2. 35 by 3, by 5, by 7, by 9.	10. 293 by 8, 9, 7, 4.
3. 42 by 3, by 6, by 9, by 8.	11. 503 by 4, 6, 8, 9.
4. 54 by 4, 6, 8, 9.	12. 607 by 7, 6, 5, 8.
5. 63 by 3, 5, 7, 9.	13. 1,208 by 7, 5, 8, 9.
6. 84 by 5, 7, 9, 8.	14. 5,409 by 6, 7, 8, 9.
7. 96 by 6, 8, 9, 4.	
8. 112 by 4, 7, 9, 6.	

$$209 \times 10 = ?$$

$$\begin{array}{r}
 209 \\
 \times 10 \\
 \hline
 2090
 \end{array}$$

10 nines are 90. Write 0, carry 9.  
 10 naughts are 0. 0 and 9 are 9.  
 Write 9. 10 twos are 20. Write 20.  
 The product is 2090.

Notice that the product contains the same figures as the multiplicand with a naught in the units' place. Hence, to multiply a number by 10, write 0 in the units' place of the product and to its left write the multiplicand.

$$209 \times 20 = ?$$

$$\begin{array}{r}
 209 \\
 \times 20 \\
 \hline
 4180
 \end{array}$$
 To multiply a number by 20 gives twice as large a product as to multiply the same number by 10. Hence, we can multiply by 20 by writing naught in the units' place, and multiplying the multiplicand by 2, writing the result to the left of this naught.

In like manner we can multiply by 30, 40, 50, 60, 70, 80, 90.

#### EXERCISE 17 (Written)

Multiply :

1. 125 by 20, 30, 40, 70.
2. 274 by 10, 30, 50, 70, 90.
3. 493 by 20, 40, 60, 80.
4. 508 by 30, 50, 70, 90.
5. 964 by 10, 30, 50, 70.
6. 1,491 by 20, 40, 60, 80.
7. 3,915 by 30, 60, 90, 80.
8. 7,778 by 20, 50, 40, 80.
9. 510 by 30, 50, 70, 90.
10. 1,060 by 30, 70, 90, 80.
11. 21,600 by 50, 70, 90.

12. 30,500 by 60, 80, 90.
13. 40,400 by 70, 80, 90, 60.
14. 120,600 by 70, 90, 60, 40.

$$564 \times 36 = ?$$

$$\begin{array}{r}
 564 \\
 \times 36 \\
 \hline
 3384 \\
 16920 \\
 \hline
 20304
 \end{array}$$

First multiply the multiplicand by 6. Next multiply the multiplicand by 30. Then add the two partial products for the final product. Hence, to multiply a number by a number consisting of two figures, first, multiply the multiplicand by the units' figure of the multiplier and write the product so that its units' figure stands in the units' column; next, multiply the multiplicand by the tens' figure of the multiplier, and write the first figure of this partial product directly under the figure of the multiplier which produced it. Then add the partial products.

#### **EXERCISE 18 (Written)**

Multiply :

1. 23 by 14.	11. 105 by 35.	21. 144 by 36.
2. 25 by 16.	12. 125 by 18.	22. 192 by 48.
3. 32 by 21.	13. 192 by 28.	23. 168 by 42.
4. 36 by 23.	14. 214 by 64.	24. 696 by 58.
5. 42 by 24.	15. 235 by 72.	25. 993 by 85.
6. 47 by 25.	16. 296 by 37.	26. 1,471 by 75.
7. 58 by 25.	17. 300 by 68.	27. 2,350 by 47.
8. 64 by 32.	18. 472 by 59.	28. 425 by 85.
9. 75 by 24.	19. 568 by 81.	29. 522 by 87.
10. 96 by 36.	20. 924 by 84.	30. 3,428 by 69.

$$24 \times 100 = ?$$

$$\begin{array}{r}
 24 \\
 \times 100 \\
 \hline
 2400
 \end{array}$$
 100 times 24 is evidently 2,400.  
 What is the result of multiplying any number by 100? It is evidently so many hundred.

To multiply any number by 100, move each figure of the multiplicand two places to the left and fill in the units' and tens' places with ciphers.

To multiply any number by 200, 300, 400, etc., multiply the multiplicand by 2, 3, or 4, etc., writing the first figure of the partial product in the hundreds' place, and fill in the tens' and units' places of the product with ciphers.

#### EXERCISE 19 (Written)

Multiply :

1. 270 by 200, 300, 500.
2. 325 by 400, 600, 800.
3. 524 by 700, 800, 900.
4. 1,215 by 300, 500, 700.
5. 3,775 by 400, 600, 800.
6. 7,384 by 500, 700, 900.
7. 1,250 by 400, 600, 800.
8. 3,750 by 500, 700, 900.
9. 9,500 by 600, 800, 900.
10. 4,200 by 400, 700, 900.
11. 6,800 by 300, 500, 800.
12. 5,250 by 200, 400, 700.

$$4,268 \times 345 = ?$$

$$\begin{array}{r}
 4268 \\
 \times 345 \\
 \hline
 21340 \\
 17072 \\
 \hline
 12804 \\
 \hline
 1472460
 \end{array}$$

We multiply the multiplicand by each figure of the multiplier, writing the first figure of each partial product directly under the figure of the multiplier which produced it. Then add the partial products. The result obtained is the product of the two numbers.

**EXERCISE 20 (Written)**

1. $672 \times 168 = ?$	12. $3,184 \times 199 = ?$
2. $1,107 \times 123 = ?$	13. $3,488 \times 218 = ?$
3. $1,936 \times 121 = ?$	14. $2,025 \times 675 = ?$
4. $2,475 \times 119 = ?$	15. $2,988 \times 332 = ?$
5. $2,097 \times 233 = ?$	16. $2,376 \times 132 = ?$
6. $2,376 \times 264 = ?$	17. $676 \times 492 = ?$
7. $2,592 \times 288 = ?$	18. $1,216 \times 154 = ?$
8. $2,952 \times 1,028 = ?$	19. $7,110 \times 790 = ?$
9. $956 \times 239 = ?$	20. $9,880 \times 247 = ?$
10. $1,968 \times 492 = ?$	21. $1,050 \times 630 = ?$
11. $2,682 \times 298 = ?$	22. $2,080 \times 680 = ?$

23. Find the cost of 7 head of cattle at \$45 a head.  
 The cost of 23 head at the same rate.

24. What will a farm of 165 acres cost at \$65 an acre?

25. What will 2,180 tons of coal cost at \$7 a ton?

26. There are 36 inches in one yard. How many inches are in 5 yards?

27. How many inches are there in 1,760 yards ?  
In 5,280 yards ?

28. A train travels 33 miles an hour. How far will it go in 4 hours ? How far will it go in 48 hours ?

29. There are 640 acres in 1 square mile. How many acres are in 5 square miles ? How many acres are in 12 square miles ?

30. How many acres are in Rhode Island, which contains 1,250 square miles ?

31. How many acres are in the District of Columbia, which contains 70 square miles ?

32. Find the cost of 57 farm wagons at \$ 68 each.

33. A ranchman sold 147 horses at \$ 84 apiece. How much did he get for his horses ?

**EXERCISE 21 (Written)**

1. There are 5,280 feet in a mile. How many feet are in 2 miles ? How many feet are in 5 miles ? In 30 miles ?

2. There are 1,760 yards in a mile. How many yards are in 3 miles ? How many yards are contained in the sides of a square which has 1 mile for a side ?

3. A certain city is in the shape of a rectangle ; it is 5 miles long and 3 miles wide. How many miles make the distance around it ? How many yards make the distance around the same city ?

4. How many pecks are in 2 bushels? How many pecks are there in 10 bushels? How many pecks are there in 25 bushels?
5. How many quarts are in 8 pecks? How many quarts are in 1 bushel? How many quarts are in 3 bushels?
6. A bushel of wheat weighs 60 pounds. How many pounds will 5 bushels weigh? How many pounds will 64 bushels weigh?
7. A train travels 35 miles an hour. At this rate, how far will it go in 24 hours?
8. An ocean steamship travels at the rate of 21 miles an hour. How far will it go in 2 days? In one week?
9. The distance from New York City to Atlanta, Ga., is 882 miles. A train leaves New York City for Atlanta, traveling at the rate of 36 miles an hour. How far will it be from Atlanta when it has traveled 24 hours?
10. Denver, Colorado, is 1,930 miles from New York City. An express train leaves New York City for Denver, traveling at the average rate of 32 miles an hour. How far will the train be from Denver after it has traveled 60 hours?
11. Trenton, N. J., is 57 miles from New York City. Suppose a person leaves New York City for Trenton on a bicycle, traveling at the rate of 6 miles an hour. How far will he be from Trenton after he has traveled 7 hours?

## MULTIPLICATION TABLE

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8.	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

## DIVISION

## EXERCISE 22 (Oral)

1. If \$24 is divided equally among 6 boys, how many dollars will each get? What is the sixth part of 24?
2. If 30 oranges are divided equally among 5 boys, how many oranges will each boy get? What is the fifth part of 30?
3. If 54¢ is divided equally among 9 girls, how many cents will each get? What is the ninth part of 54?

4. If a boy can walk 3 miles an hour, how many hours will it take him to walk 12 miles? How many 3's are in 12?

5. If a boy can ride 7 miles an hour on a bicycle, how many hours will it take him to ride 21 miles? How many 7's are in 21?

6. If \$56 are divided among a number of boys, so that each boy receives \$7, how many boys are there? How many 7's are in 56?

7. If a cord of wood costs \$5, how many cords of wood can be bought for \$23? How many 5's are in 23?

8. If a pound of sugar costs 6¢, how many pounds of sugar can be bought for 25¢? How often is 6 contained in 25?

9. How often is 9 contained in 75? 9 is contained in 75 8 times, with 3 left over. In this example 9 is called the divisor, 75 is called the dividend, 8 is called the quotient, and 3 is called the remainder.

Division enables us to find how often one number is contained in another number, or to find any part of a number.

Divide 36 by 2.

This problem may mean either of two things, namely: What is the half of 36, or how many 2's are in 36?

$$\begin{array}{r} 2)36 \\ \underline{18} \end{array}$$
 To work this problem, we write the 2 to the left of 36, separating them by a curved line. We then say 2 into 3 tens gives 1 ten and 1 ten over. Write the 1 directly under the

3 tens. 1 ten and 6 ones are 16. 2 into 16 goes 8 times. Write 8 directly under the 6 ones. The answer is 18.

Divide 79 by 3.

$3\overline{)79}$

26, remainder 1. To work this problem, we arrange the numbers as before. 3 into 7 tens and 1 ten over. Write 2 directly under the 7 tens. 1 ten over and 9 ones are 19 ones. 3 into 19 goes 6 times with a remainder of 1. Write 6 directly under the 9 ones. The answer is 26, remainder 1.

**EXERCISE 23 (Written)**

Divide:

1. 24 by 2. 11. 36 by 3. 21. 48 by 4. 31. 95 by 5.
2. 46 by 2. 12. 69 by 3. 22. 88 by 4. 32. 72 by 6.
3. 68 by 2. 13. 96 by 3. 23. 52 by 4. 33. 84 by 6.
4. 74 by 2. 14. 48 by 3. 24. 67 by 4. 34. 96 by 6.
5. 82 by 2. 15. 57 by 3. 25. 76 by 4. 35. 81 by 6.
6. 92 by 2. 16. 90 by 3. 26. 87 by 4. 36. 84 by 7.
7. 98 by 2. 17. 75 by 3. 27. 96 by 4. 37. 91 by 7.
8. 64 by 2. 18. 42 by 3. 28. 79 by 4. 38. 99 by 7.
9. 67 by 2. 19. 47 by 3. 29. 75 by 5. 39. 96 by 8.
10. 58 by 2. 20. 64 by 3. 30. 85 by 5. 40. 91 by 8.

Divide 369 by 4.

$4\overline{)369}$

92, remainder 1. The figure 3 in 369 stands for 3 hundred. 4 is not contained in 3. We therefore change the 3 hundred into 30 tens. 30 tens and 6

tens are 36 tens. 4 into 36 tens goes 9 tens times. Write 9 directly under 6. 4 into 9 ones goes 2 times with a remainder 1. Write 2 directly under the 9.

Since in our system of writing numbers each figure increases tenfold in value as we go to the left, we can shorten this work as follows: 4 is not contained in 3, we therefore divide 4 into 36. It goes 9 times. Write 9 directly under 6. 4 into 9 goes 2 times, remainder 1. Write 2 directly under 9.

**EXERCISE 24 (Written)**

Divide:

1. 225 by 3. 11. 590 by 5. 21. 847 by 7.
2. 376 by 3. 12. 693 by 5. 22. 9,718 by 7.
3. 492 by 3. 13. 884 by 5. 23. 6,521 by 7.
4. 784 by 3. 14. 926 by 5. 24. 5,403 by 7.
5. 1,219 by 3. 15. 676 by 5. 25. 9,009 by 8.
6. 2,784 by 3. 16. 696 by 6. 26. 8,218 by 8.
7. 9,480 by 3. 17. 824 by 6. 27. 12,750 by 8.
8. 484 by 4. 18. 986 by 6. 28. 15,308 by 8, by 9.
9. 525 by 4. 19. 2,799 by 6. 29. 20,206 by 8, by 9.
10. 778 by 4. 20. 5,712 by 6. 30. 27,918 by 7, by 9.
31. 30,912 by 7, by 8, by 9.
32. 45,416 by 7, by 8, by 9, by 10.
33. If a pound of sugar cost 6¢, how many pounds can be bought for 84¢?
34. When a ton of coal costs \$7, how many tons can be bought for \$98?

35. When muslin costs 8¢ a yard, how many yards can be bought for 96¢?
36. When a pair of shoes costs \$4, how many pairs can be bought for \$92?
37. If land rents for \$6 an acre, how many acres can be rented for \$78?
38. How many barrels of flour can be bought for \$150, at \$6 a barrel?
39. When hay sells at \$9 a ton, how many tons can be bought for \$243?
40. At \$5 a head, how many sheep can be bought for \$685?
41. How many school desks can be bought for \$234, if one desk costs \$3?
42. If a boy can walk 3 miles an hour, how many hours will it take him to walk 42 miles?
43. If a cord of wood costs \$5, how many cords can be bought for \$180?
44. A man left an estate valued at \$4,790 to be divided equally among 5 children. Find each child's share.
45. A man left an estate valued at \$9,000. He left his widow \$4,000, the remainder of the estate to be divided equally among his 4 children. Find each child's share.
46. Sound travels 6,600 feet in 6 seconds. How far does it travel in 1 second?
47. A railroad train travels 315 miles in 9 hours. What is its rate per hour?

48. A street car travels at the rate of 9 miles an hour. How long will it take the street car to go 108 miles?

49. A man rides in an automobile 135 miles in 9 hours. How far does he ride in 1 hour?

50. A steamship makes a distance of 171 miles in 9 hours. Find its speed per hour.

## LONG DIVISION

Divide 525 by 21.

25                    21 into 52 tens is contained 2 tens  
 21)525            times. Write 2 directly above the 2 in  
                       the dividend. Multiply the divisor, 21,  
         42            by 2, and write the product under the  
         105            52. Subtract. Take down the next  
         105            figure in the dividend. 21 is contained  
 in 105, 5 times. Write the 5 above the 5 in the  
 dividend. Multiply the 5 by the divisor, 21, and  
 write the product, 105, under 105. The quotient  
 is 25.

## EXERCISE 25 (Written)

Divide:

1. 273 by 21.	9. 1,056 by 33.
2. 308 by 22.	10. 850 by 25.
3. 576 by 24.	11. 1,225 by 35.
4. 325 by 13.	12. 1,152 by 36.
5. 210 by 14.	13. 1,428 by 42.
6. 336 by 16.	14. 1,584 by 36.
7. 357 by 17.	15. 2,025 by 45.
8. 480 by 32.	16. 1,200 by 48.

17. 1,176 by 49. 24. 5,292 by 42.  
18. 2,756 by 52. 25. 6,075 by 45.  
19. 1,352 by 26. 26. 6,348 by 46.  
20. 1,458 by 27. 27. 8,427 by 53.  
21. 2,738 by 74. 28. 9,075 by 55.  
22. 4,332 by 38. 29. 12,288 by 64.  
23. 4,563 by 39. 30. 17,956 by 67.  
31. A farm was sold for \$1,950 at \$26 an acre.  
How many acres were in the farm?  
32. A train travels 1,088 miles at the rate of 32 miles an hour. How many hours does it take to perform the journey?  
33. A number of cattle were sold for \$1,221 at the rate of \$37 a head. How many cattle were sold?  
34. How many mowers at \$42 each can be bought for \$1,890?  
35. How many farm wagons at \$52 each can be bought for \$1,352?  
36. How many buggies at \$75 apiece can be bought for \$6,375?  
37. How many horses at \$72 a head can be bought for \$2,592?  
38. A dealer bought 24 sets of furniture for \$2,208. Find the cost of one set of furniture.  
39. How many yards are in 1,728 inches?  
40. 7,200 oranges are put up in 75 boxes. How many oranges are in a box?  
41. If 24 men give \$3,648; in like amounts, to build a church, how much does each give?

**42.** Choice Alfalfa hay sells at \$18 a ton. How many tons can be bought for \$648?

**43.** An electric light company pays \$4,624 for poles at \$34 apiece. How many poles does the company buy?

**44.** A hardware company buys a carload of heating stoves for \$1,445, at \$17 apiece. How many stoves are in the carload?

**45.** A trader sells 48 mules for \$4,608. What is the average price of a mule?

**46.** A dealer buys 68 buggies for \$5,712. What does each buggy cost?

**47.** A trader ships 24 cattle to Kansas City and sells them for \$1,080. Find the price per head.

**48.** A farmer sells 69 acres of land for \$1,587. Find the price per acre.

**49.** A merchant buys 85 barrels of sugar for \$1,360. Find what one barrel of sugar costs.

**50.** If a merchant buys 17 book-cases for \$272, what does one book-case cost?

Divide 194,880 by 96.

2030

96)194880      96 is contained in 194 thousand, 2

192      thousand times. Write 2 directly

288      above the 4, that is in the thousands' place.

288      Multiply the divisor, 96, by

0      2, and subtract the product, 192 thousand, from 194 thousand. Take down the next figure in the dividend, 8. 96 is not contained in 28. Write

0 in the quotient and bring down the next figure, 8. 96 is contained in 288 tens 3 tens times. Write 3 in the tens' place of the quotient. Multiply the divisor by 3 and subtract the product from 288 tens. Take down the next figure of the dividend, 0. 96 into 0 goes 0 times. Write 0 in the units' place of the quotient. The answer is 2,030.

**EXERCISE 26 (Written)**

Divide :

1. 3,888 by 36.	19. 166,464 by 408.
2. 8,405 by 41.	20. 259,081 by 509.
3. 5,408 by 52.	21. 46,656 by 72.
4. 5,618 by 53.	22. 56,169 by 79.
5. 12,544 by 56.	23. 59,536 by 61.
6. 18,605 by 61.	24. 70,225 by 53.
7. 31,752 by 63.	25. 87,025 by 59.
8. 9,248 by 68.	26. 133,225 by 73.
9. 13,872 by 68.	27. 147,456 by 96.
10. 21,316 by 73.	28. 156,816 by 132.
11. 36,750 by 35.	29. 158,404 by 199.
12. 13,467 by 67.	30. 181,476 by 142.
13. 10,404 by 51.	31. 219,024 by 156.
14. 11,664 by 54.	32. 239,121 by 163.
15. 31,827 by 103.	33. 352,836 by 198.
16. 82,418 by 203.	34. 467,856 by 228.
17. 41,616 by 204.	35. 839,056 by 229.
18. 93,636 by 306.	36. 898,704 by 316.

Divide 340 by 10.

$$\begin{array}{r} 10)340 \\ \hline 34 \end{array}$$

Divide 784 by 10.

$$\begin{array}{r} 10)784 \\ \hline 78 \end{array}$$

remainder 4.

To divide by 10, move each figure of the dividend one place to the right; the units' figure will be the remainder; the quotient will be the number represented by the remaining figures of the dividend.

**EXERCISE 27 (Oral or Written)**

1. $300 \div 10 = ?$	16. $2,785 \div 10 = ?$
2. $500 \div 10 = ?$	17. $9,415 \div 10 = ?$
3. $700 \div 10 = ?$	18. $10,290 \div 10 = ?$
4. $900 \div 10 = ?$	19. $12,984 \div 10 = ?$
5. $1,000 \div 10 = ?$	20. $23,998 \div 10 = ?$
6. $6,000 \div 10 = ?$	21. $57,819 \div 10 = ?$
7. $9,000 \div 10 = ?$	22. $84,520 \div 10 = ?$
8. $10,000 \div 10 = ?$	23. $75,773 \div 10 = ?$
9. $12,500 \div 10 = ?$	24. $100,284 \div 10 = ?$
10. $20,590 \div 10 = ?$	25. $150,553 \div 10 = ?$
11. $324 \div 10 = ?$	26. $784,750 \div 10 = ?$
12. $586 \div 10 = ?$	27. $1,500,500 \div 10 = ?$
13. $793 \div 10 = ?$	28. $2,200,002 \div 10 = ?$
14. $1,010 \div 10 = ?$	29. $7,700,403 \div 10 = ?$
15. $1,415 \div 10 = ?$	30. $8,211,314 \div 10 = ?$

Divide 800 by 100.

$$\begin{array}{r} 100)800 \\ \hline 8 \end{array}$$

Divide 7,890 by 100.

$$\begin{array}{r} 100)7,890 \\ \hline 78, \text{ remainder } 90. \end{array}$$

7,890 may be read as 78 hundred and 90; hence, the quotient obtained by dividing 7,890 by 100 is 78 with a remainder of 90.

To divide a number by 100, move each figure of the dividend two places to the right; the number represented by the two right-hand figures of the dividend will be the remainder; the quotient will be the number formed by the remaining figures of the dividend.

**EXERCISE 28 (Oral or Written)**

1. $600 \div 100 = ?$	13. $925 \div 100 = ?$
2. $700 \div 100 = ?$	14. $863 \div 109 = ?$
3. $800 \div 100 = ?$	15. $768 \div 100 = ?$
4. $900 \div 100 = ?$	16. $679 \div 100 = ?$
5. $1,000 \div 100 = ?$	17. $739 \div 100 = ?$
6. $2,000 \div 100 = ?$	18. $694 \div 100 = ?$
7. $3,000 \div 100 = ?$	19. $327 \div 100 = ?$
8. $5,000 \div 100 = ?$	20. $967 \div 100 = ?$
9. $7,000 \div 100 = ?$	21. $589 \div 100 = ?$
10. $9,000 \div 100 = ?$	22. $765 \div 100 = ?$
11. $10,000 \div 100 = ?$	23. $9,245 \div 100 = ?$
12. $584 \div 100 = ?$	24. $8,567 \div 100 = ?$

25.  $10,234 \div 100 = ?$       29.  $6,923,482 \div 100 = ?$   
 26.  $13,987 \div 100 = ?$       30.  $13,629,584 \div 100 = ?$   
 27.  $87,456 \div 100 = ?$       31.  $43,756,470 \div 100 = ?$   
 28.  $2,935,567 \div 100 = ?$       32.  $54,786,260 \div 100 = ?$   
 33.  $65,987,234 \div 100 = ?$

Divide 17,294 by 1,000.

$$\begin{array}{r} 1000) \underline{17294} \\ \quad \quad \quad 17, \text{ remainder } 294. \end{array}$$

To divide a number by 1000, move each figure of the dividend three places to the right; the number represented by the three right-hand figures of the dividend will be the remainder; the quotient will be the number represented by the remaining figures of the dividend.

**EXERCISE 29 (Oral or Written)**

1.  $5,280 \div 1,000 = ?$       5.  $47,218 \div 1,000 = ?$   
 2.  $6,890 \div 1,000 = ?$       6.  $94,530 \div 1,000 = ?$   
 3.  $12,387 \div 1,000 = ?$       7.  $75,346 \div 1,000 = ?$   
 4.  $15,215 \div 1,000 = ?$       8.  $95,876 \div 1,000 = ?$   
 9.  $1,432,657 \div 1,000 = ?$   
 10.  $4,234,632 \div 1,000 = ?$   
 11.  $8,234,982 \div 1,000 = ?$   
 12.  $9,235,543 \div 1,000 = ?$   
 13.  $6,965,276 \div 1,000 = ?$   
 14.  $8,293,847 \div 1,000 = ?$   
 15.  $8,268,495 \div 1,000 = ?$   
 16.  $23,657,395 \div 1,000 = ?$

17.  $12,346,845 \div 1,000 = ?$
18.  $32,345,768 \div 1,000 = ?$
19.  $23,987,234 \div 1,000 = ?$
20.  $56,252,926 \div 1,000 = ?$
21.  $45,456,876 \div 1,000 = ?$
22.  $23,765,234 \div 1,000 = ?$
23.  $19,295,478 \div 1,000 = ?$
24.  $23,432,567 \div 1,000 = ?$

## UNITED STATES MONEY

$$\$1 = 100\text{¢}.$$

How many cents are in \$2? In \$3? In \$4?  
In \$5? In \$8? In \$10?

How many cents are in  $\$ \frac{1}{2}$ ? In  $\$ \frac{1}{4}$ ?

How many cents are in 1 dime? In 2 dimes? In 3 dimes? In 5 dimes?

How many cents are in 8 dimes?

How many dimes are in \$1? In \$2? In \$3?  
In \$5? In \$8?

What part of \$1 is 20¢? 25¢? 50¢?

## NOTATION

100¢ is written \$1.00, and is read one dollar.

101¢ is written \$1.01, and is read one dollar and one cent.

102¢ is written \$1.02, and is read one dollar and two cents.

103¢ is written \$1.03, and is read one dollar and three cents.

110¢ is written \$1.10, and is read one dollar and ten cents.

111¢ is written \$1.11, and is read one dollar and eleven cents.

115¢ is written \$1.15, and is read one dollar and fifteen cents.

120¢ is written \$1.20, and is read one dollar and twenty cents.

125¢ is written \$1.25, and is read one dollar and twenty-five cents.

130¢ is written \$1.30, and is read one dollar and thirty cents.

140¢ is written \$1.40, and is read one dollar and forty cents.

150¢ is written \$1.50, and is read one dollar and fifty cents.

160¢ is written \$1.60, and is read one dollar and sixty cents.

175¢ is written \$1.75, and is read one dollar and seventy-five cents.

195¢ is written \$1.95, and is read one dollar and ninety-five cents.

200¢ is written \$2.00, and is read two dollars.

205¢ is written \$2.05, and is read two dollars and five cents.

210¢ is written \$2.10, and is read two dollars and ten cents.

225¢ is written \$2.25, and is read two dollars and twenty-five cents.

The period written between dollars and cents is called the **decimal point**.

In the notation of dollars and cents, what does 2 written in the place immediately to the right of the decimal point stand for? What does 5 written in the first place after the decimal point stand for? What does 5 written in the second place to the right of the decimal point stand for? What does 8 written in the second place to the right of the decimal point stand for? What does 5 written in the first place to the left of the decimal point denote? What does 5 written in the second place to the left of the decimal point denote?

1. Change  $750\text{¢}$  to dollars and cents.

$$\begin{array}{r} 100)750\text{¢} \\ \hline & \$7, \text{ remainder } 50\text{¢} \end{array}$$

Since  $100\text{¢} = \$1$ , there are as many dollars in  $750\text{¢}$  as  $100\text{¢}$  is contained in  $750\text{¢}$ .  $100\text{¢}$  is contained in  $750\text{¢}$ , 7 times, remainder 50. Hence, the answer is \$7 and 50 cents. This is written \$7.50.

To change cents to dollars and cents, divide the number of cents by 100; the quotient will be the number of dollars and the remainder will be the number of cents.

#### EXERCISE 30 (Oral)

Change to dollars and cents:

1. $145\text{¢}$	4. $980\text{¢}$	7. $1,225\text{¢}$	10. $2,180\text{¢}$
2. $384\text{¢}$	5. $1,250\text{¢}$	8. $1,832\text{¢}$	11. $2,295\text{¢}$
3. $796\text{¢}$	6. $1,175\text{¢}$	9. $2,000\text{¢}$	12. $2,618\text{¢}$

13. 3,250¢    17. 11,400¢    21. 18,520¢    25. 26,257¢  
 14. 4,490¢    18. 12,790¢    22. 20,000¢    26. 27,500¢  
 15. 5,555¢    19. 12,500¢    23. 25,000¢    27. 30,000¢  
 16. 10,000¢    20. 13,575¢    24. 24,200¢    28. 50,000¢  
 29. 80,500¢                    30. 1,000,000¢

Change \$9.72 to cents.

\$1 = 100 cents; \$9 = 900 cents.

\$9 and 72¢ = 972¢. The answer is 972 cents.

Notice that the answer can be obtained at once by moving the decimal point two places to the right.

**EXERCISE 31 (Oral)**

Change to cents:

1. \$ 2.75	15. \$ 45.75	29. \$ 985.85
2. \$ 3.25	16. \$ 50.00	30. \$ 1,000.00
3. \$ 5.75	17. \$ 75.50	31. \$ 1,200.00
4. \$ 7.50	18. \$ 80.54	32. \$ 1,234.00
5. \$ 9.45	19. \$ 90.85	33. \$ 1,456.75
6. \$ 9.75	20. \$ 100.00	34. \$ 2,457.98
7. \$ 10.00	21. \$ 101.01	35. \$ 3,789.95
8. \$ 10.75	22. \$ 345.98	36. \$ 4,765.78
9. \$ 15.85	23. \$ 450.98	37. \$ 8,985.95
10. \$ 19.85	24. \$ 500.01	38. \$ 12,975.42
11. \$ 23.60	25. \$ 567.92	39. \$ 29,478.69
12. \$ 25.00	26. \$ 700.75	40. \$ 105,568.65
13. \$ 25.95	27. \$ 801.11	41. \$ 750,897.59
14. \$ 43.89	28. \$ 907.10	42. \$ 978,450.65
43. \$ 1,000,000.00		

## ADDITION

Add :

	25¢		\$ 0.25
	64		0.64
(i)	75	(ii)	0.75
	90		0.90
	85		0.85
	<u>339¢</u>		<u>\$ 3.39</u>

Example (ii) is the same as example (i). They differ only in the notation. Hence, in adding dollars and cents, write the numbers denoting the dollars and cents so that the decimal points are in the same vertical line, then add as in simple addition, placing the decimal point in the sum in the same column as the decimal points in the numbers added.

## EXERCISE 32 (Written)

Add :

(1)	(2)	(3)	(4)
\$ 1.25	\$ 7.90	\$ 8.90	\$ 9.67
2.50	8.67	5.00	7.70
3.10	2.90	7.80	10.67
3.98	5.87	9.90	57.90
<u>5.75</u>	<u>4.98</u>	<u>8.70</u>	<u>87.10</u>
(5)	(6)	(7)	(8)
\$ 119.65	\$ 567.56	\$ 456.98	\$ 678.67
234.98	234.98	678.23	697.25
567.45	768.34	987.45	532.85
567.87	769.60	879.65	989.90
987.54	564.23	872.67	769.10
923.89	999.99	777.58	650.80
<u>643.70</u>	<u>342.91</u>	<u>654.90</u>	<u>659.15</u>

(9)	(10)	(11)
\$ 4,265.87	\$ 2,567.10	\$ 295.87
2,564.98	4,532.98	287.98
9,238.45	9,498.50	5,456.90
7,987.45	9,234.76	6,789.80
4,985.45	4,389.60	8,769.95
6,546.91	5,478.10	9,283.85
8,562.19	6,239.75	2,345.25
<u>56,787.90</u>	<u>5,498.75</u>	<u>5,678.25</u>
(12)	(13)	(14)
\$ 2,456.98	\$ 2,396.96	\$ 5,239.98
7,678.75	7,239.75	6,234.75
69,875.90	6,985.50	54,426.90
53,982.16	7,123.95	75,452.25
23,456.25	8,295.25	95,275.65
76,987.57	9,265.65	23,245.96
54,876.56	5,789.98	76,238.65
345,789.98	67,879.56	567,238.54
<u>567,296.65</u>	<u>65,295.52</u>	<u>875,287.65</u>
(15)	(16)	(17)
\$ 4,236.89	\$ 109,108.01	\$ 207,017.09
5,987.50	909,509.80	765,907.07
56,785.10	760,950.95	545,245.55
25,246.50	955,235.65	965,950.85
67,872.19	235,555.75	755,456.34
56,294.87	986,956.52	957,235.45
56,239.65	555,265.25	525,875.35
657,297.75	572,875.95	980,001.75
<u>285,957.65</u>	<u>769,295.65</u>	<u>769,239.25</u>

(18)	(19)	(20)
\$707,406.05	\$23,000.00	\$654,009.10
940,940.90	75,565.95	985,901.90
750,969.85	95,234.90	875,545.55
965,765.68	78,945.35	955,432.25
750,234.75	95,275.50	750,875.50
5,557,235.56	55,259.25	565,245.75
2,359,395.25	96,294.45	890,008.00
5,247,987.90	23,468.59	265,295.60
8,769,295.75	54,296.10	562,395.10

## EXERCISE 33 (Written)

1. A merchant's sales for a week were as follows:

Monday . . . . .	\$215.75
Tuesday . . . . .	275.85
Wednesday . . . . .	286.30
Thursday . . . . .	279.10
Friday . . . . .	300.00
Saturday . . . . .	497.98

Find the merchant's total sales for the week.

2. The value of barley produced in five New England states in the year 1898 was as follows: Maine, \$183,087.75; New Hampshire, \$66,990.50; Vermont, \$250,120.50; Massachusetts, \$27,683.00; Rhode Island, \$5,431.00. Find the total value of the barley produced in these five states.

3. A Texas farmer sold during the year wheat to the value of \$497.85; cotton, \$655.75; hogs, \$385.75; poultry, \$132.10; cattle, \$347.90. Find the amount of his sales.

4. The value of the principal crops in the state of Connecticut for the year 1898 was as follows: Corn, \$862,047.75; wheat, \$5,280.25; oats, \$202,522.50; rye, \$155,433.50; buckwheat, \$36,824.60; potatoes, \$1,391,995.40; hay, \$6,876,361.00. Find the total value of these crops.

5. In furnishing her house a lady bought the following articles at a furniture store at the prices indicated: Parlor set, \$237.75; three bedroom sets for \$175.90; dining room furniture, \$185.00; articles for the kitchen, \$50.50; two book-cases for \$57.75, and a hat-rack for \$17.00. Find the amount of the lady's bill.

6. A traveling man's expenses were, in January, \$120.50; in February, \$115.70; in March, \$127.75; in April, \$123.50; in May, \$130.90. Find his expenses for the five months.

7. The school children of the following cities in the state of Rhode Island contributed the amounts indicated to rebuild the Galveston schools after the storm of 1900: Pascoag, \$34.75; Newport, \$107.00; Woonsocket, \$110.43; Pawtucket, \$136.47; Providence, \$910.06. Find the total amount given by the school children of these cities to rebuild the schools of Galveston.

8. A man's monthly income from rent of a dwelling-house is \$17.50; from rent of a store, \$85.60; from interest on money loaned, \$85.75; from rent of a farm, \$68.50; his regular business

pays him on an average \$185.00 a month. What is his monthly income from all sources?

9. The weekly pay-roll of a contractor is, for laborers, \$2,700.85; for material, \$9,798.50; for freight charges, \$140.90; for drayage, \$205.80; for a bookkeeper, \$18.75. Find the total pay-roll of the contractor.

10. The monthly pay-roll for the schools of a certain city is as follows: Teachers' salaries, \$7,850.50; janitors' salaries, \$350.75; fuel, \$250.89; stationery, \$128.90; repairs, \$475.75; miscellaneous items, \$34.85. Find the total pay-roll.

11. For the year 1901-02 the value of lard exported from the United States was as follows: To the United Kingdom, \$19,019,941.00; to France, \$691,981.75; to Germany, \$16,237,484.90; to British North America, \$175,156.80; to Mexico, \$702,082.75; to Cuba, \$2,144,299.90; to the West Indies, \$543,697.50. Find the total value of the lard exported to these countries in the year 1901-02.

12. The value of silver produced in the principal silver-producing states of the United States in the year ending June 30, 1902, was as follows: Nevada, \$105,734,658.16; Montana, \$22,508,433.34; Colorado, \$25,219,278.97; Arizona, \$14,217,985.76; California, \$4,560,312.88; Utah, \$20,045,581.69; New Mexico, \$7,554,643.22. Find the total value of the silver produced in the states mentioned.

## SUBTRACTION

From \$10 take \$5.84.

\$10.005.84\$4.16

Write the subtrahend under the minuend so that the decimal points are in the same vertical column; then proceed as in simple subtraction,

writing the decimal point in the remainder in the same column as the decimal points in the minuend and subtrahend.

## EXERCISE 34 (Written)

(1)	(2)	(3)	(4)	(5)	(6)
\$8.85	\$9.50	\$7.85	\$7.90	\$5.80	\$8.10
<u>6.09</u>	<u>7.90</u>	<u>4.97</u>	<u>5.75</u>	<u>4.95</u>	<u>3.79</u>

(7)	(8)	(9)	(10)	(11)	(12)
\$6.10	\$25.50	\$35.95	\$45.75	\$55.10	\$75.90
<u>2.60</u>	<u>15.90</u>	<u>24.80</u>	<u>32.95</u>	<u>34.79</u>	<u>55.67</u>

(13)	(14)	(15)	(16)	(17)
\$89.90	\$99.90	\$123.98	\$234.56	\$435.98
<u>56.67</u>	<u>78.98</u>	<u>67.87</u>	<u>210.90</u>	<u>234.56</u>

(18)	(19)	(20)	(21)	(22)
\$654.20	\$876.98	\$987.90	\$999.90	\$567.98
<u>345.89</u>	<u>654.45</u>	<u>654.89</u>	<u>598.99</u>	<u>345.90</u>

(23)	(24)	(25)	(26)
\$987.90	\$1,543.89	\$2,346.87	\$3,876.89
<u>678.99</u>	<u>1,347.88</u>	<u>2,123.50</u>	<u>2,145.85</u>

(27)	(28)	(29)	(30)
<u>\$5,234.75</u>	<u>\$3,456.78</u>	<u>\$7,286.89</u>	<u>\$8,297.45</u>
2,389.90	2,326.90	5,987.56	7,927.80
(31)	(32)	(33)	(34)
<u>\$9,296.89</u>	<u>\$9,496.50</u>	<u>\$11,459.90</u>	<u>\$45,278.95</u>
5,285.75	7,897.67	8,987.80	25,876.85
(35)	(36)	(37)	(38)
<u>\$56,987.98</u>	<u>\$98,876.45</u>	<u>\$99,785.25</u>	<u>\$234,765.50</u>
43,237.99	56,295.65	49,597.67	221,987.75
(39)	(40)	(41)	
<u>\$234,492.56</u>	<u>\$678,987.98</u>	<u>\$982,679.65</u>	
198,569.89	200,909.09	205,019.98	
(42)	(43)	(44)	
<u>\$786,987.90</u>	<u>\$2,368,987.99</u>	<u>\$5,678,987.85</u>	
409,098.97	2,111,998.91	3,799,899.97	
(45)	(46)	(47)	
<u>\$7,234,983.56</u>	<u>\$8,987,234.21</u>	<u>\$9,234,987.25</u>	
4,445,789.75	7,875,436.40	7,445,999.45	

48. A man has two ten-dollar bills and pays a bill of fifteen dollars. How much change should he get?

49. If a man has five five-dollar bills and buys a barrel of flour for \$6.50, how much money will he then have?

50. If a man has a fifty-dollar bill and buys a suit of clothes for \$15.50, how much money will he then have?

51. A merchant has \$150.75 in bank and draws out \$75.75. How much money will he have after drawing out this amount?

52. If a clerk's salary is \$50.00 a month, how much money will he have at the end of the month after paying his board-bill amounting to \$18.00, and buying a pair of shoes for \$3.50?

53. A boy has \$1; how much will he have after buying a ball for 25¢?

54. A schoolgirl had \$1; she bought a doll for 35¢. How much money had she left?

55. A man had five ten-dollar bills; he paid his house rent, amounting to \$37.50. How much money had he left?

56. The receipts of a certain post-office for the year 1902 were \$132,552.01; the expenses of the same post-office were \$39,800.61. The surplus was remitted to the United States Treasury. How much money was remitted?

57. The receipts of the same post-office for the year 1901 were \$100,419.88. Find the increase in the receipts of 1902 over 1901.

58. The amount of capital invested in Southern manufactures, in 1860, was \$95,000,000. The amount of capital invested in Southern manufactures, in 1900, was \$787,000,000. Find the increase in the 40 years.

59. The value of cotton-seed oil exported from a certain Gulf port, in 1902, was \$1,244,677.50. The

value of the cotton-seed oil exported from the same port, in 1901, was \$1,502,307. Find the decrease in the value of cotton-seed oil exported from this port.

60. The Custom House receipts of a certain city for the year 1902 were \$263,508.25. The Custom House receipts of the same city for the year 1901 were \$169,064.41. Find the increase.

61. The value of the lumber exported from Galveston, in the year 1902, was \$523,302. The value of the lumber exported from Galveston, in the year 1901, was \$479,457.25. Find the increase.

62. An agent sells wheat to the amount of \$2,475, and charges for his services \$70.50. How much money does he remit to the man for whom he sold the wheat?

63. A lawyer collects a debt amounting to \$1,207.25 and charges for collecting \$62.75. How much does he remit to the person to whom the debt is due?

64. A property owner employs an agent to collect his rents, amounting to \$750.20. If the agent charges \$45.75 for collecting, how much does the property owner receive?

65. Henry Jones has property valued at \$2,000, and owes James Smith \$150.70 and John Williams \$225. How much is Henry Jones worth?

66. Mr. John Higgins has \$3,750 in one bank and \$1,218.75, in another; he buys a home for \$2,559. How much money has Mr. Higgins left after paying for his home?

67. A land speculator bought a tract of land for \$4,500; he spent in fencing and improving it \$235.75 and then sold it for \$5,000. How much did he make on his speculation?

68. Mr. William Plant buys a house for \$2,400; he paints it and makes other improvements at an expense of \$179.40; he then sells the house for \$2,950. Find his gain.

### MULTIPLICATION

Find the cost of 6 pairs of shoes at \$3.50 a pair.

The work is performed as in the multiplication of simple numbers. Multiply \$ 3.50 by 6. Each figure of the multiplicand is multiplied by the multiplier, writing the units' figure of each partial product directly under the figure of the multiplicand producing it. The decimal point in the product is written in the same vertical column with the decimal point of the multiplicand.

### EXERCISE 35 (Written)

Multiply by 6:

1. \$ 5.50; \$ 7.50; \$ 17.50; \$ 25.75; \$ 36.85;  
\$ 90.40; \$ 100.68.

Multiply by 7:

2. \$ 8.50; \$ 9.75; \$ 15.75; \$ 20.82; \$ 18.90;  
\$ 19.95; \$ 78.75; \$ 118.67.

Multiply by 8:

3. \$ 9.80; \$ 10.60; \$ 16.25; \$ 12.50; \$ 37.50;  
\$ 87.88; \$ 92.95; \$ 118.55.

Multiply by 9 :

4. \$14.50; \$19.80; \$27.75; \$34.89; \$85.95;  
\$115.50; \$111.17; \$130.76.

Multiply by 5 :

5. \$16.89; \$18.97; \$27.83; \$39.87; \$89.65;  
\$119.93; \$158.57; \$175.79.

6. A farmer bought 9 sheep at \$5.75 a head.  
What did he pay for them ?

7. A farmer sold 9 horses at \$85.75 each. How  
much did he get for the horses ?

8. A grocer bought 9 barrels of flour at \$6.67 a  
barrel. What did the flour cost ?

9. A man bought 8 acres of land at \$45.50 an  
acre. What did the land cost ?

Multiply \$48.54 by 46.

$  \begin{array}{r}  \$ \quad 48.54 \\  \times \quad \quad 46 \\  \hline  \end{array}  $	$  \begin{array}{r}  4854\text{¢} \\  \times \quad \quad 46 \\  \hline  \end{array}  $
(i) $\frac{29124}{19416}$	(ii) $\frac{29124}{19416}$
$\frac{\$2232.84}{}$	$\frac{223284\text{¢}}{}$

The multiplicand in examples (i) and (ii) is the same sum of money ; in (i) it is expressed in dollars and cents and in (ii) as cents.  $4854\text{¢}$  multiplied by 46 gives for product  $223284\text{¢}$ , or \$2232.84. Hence, to multiply dollars and cents by any number, proceed as in multiplication of simple numbers, and beginning at right of product, point off two places for cents, and then write the dollar sign (\$) before the result.

## EXERCISE 36 (Written)

Multiply:

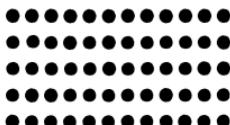
1. \$15.50 by 23.
2. \$16.80 by 24.
3. \$18.50 by 25.
4. \$30.20 by 28.
5. \$40.80 by 32.
6. \$36.70 by 36.
7. \$53.90 by 35.
8. \$67.45 by 40.
9. \$80.25 by 42.
10. \$94.68 by 48.
11. \$73.25 by 49.
12. \$82.50 by 50.
13. \$91.35 by 54.
14. \$83.78 by 56.
15. \$73.75 by 60.
16. \$84.87 by 64.
17. \$87.50 by 68.
18. \$96.18 by 72.
19. \$112.50 by 77.
20. \$150.75 by 84.
21. \$110.38 by 85.
22. \$129.54 by 88.
23. \$125.75 by 90.
24. \$115.64 by 96.
25. \$190.90 by 76.
26. \$128.75 by 67.
27. \$219.83 by 57.
28. \$439.37 by 76.
29. \$227.37 by 67.
30. \$543.10 by 86.
31. \$543.85 by 95.
32. \$765.95 by 59.
33. \$546.75 by 47.
34. \$459.99 by 99.
35. \$258.92 by 66.
36. \$1,234.75 by 105.
37. What will 9 bushels of wheat cost at 84¢ a bushel?
38. Find the cost of 8 round bales of cotton at \$19.82 a bale.
39. What will 9 sacks of flour cost at \$3.15 a sack?
40. What will 28 bushels of wheat cost at 75¢ a bushel?

41. What will 25 barrels of cotton-seed oil bring at \$18.75 a barrel?
42. Find the cost of 18 sacks of cotton-seed meal at \$1.80 a sack.
43. Find the cost of 28 sacks of cotton-seed cake at \$2.95 a sack.
44. A hardware merchant bought 28 heating stoves at \$8.75 apiece. How much did he pay for the stoves?
45. The same merchant bought 34 gasoline ranges at \$15.60 apiece. What did he pay for the ranges?
46. A farmer sold 25 head of cattle at \$37.50 a head. How much did his cattle bring?
47. A trader sold 75 mules at \$68.75 each. How much did he get for his mules?
48. A man sold 75 acres of his farm to his neighbor at \$45.75 an acre. How much money did he receive from the sale?
49. How much will 100 bushels of wheat bring at 79¢ a bushel?
50. A man sells 115 barrels of apples at \$1.75 a barrel. How much does the man get for his apples?
51. What will 100 bushels of potatoes cost at 85¢ a bushel?
52. A man sells 18 tons of hay at \$11.25 a ton. How much does he get for his hay?
53. What will 17 dozen chickens cost at \$3.25 a dozen?

54. Find the cost of 84 tons of coal at \$7.60 a ton.  
 55. Gold is worth \$20.67 an ounce. What is the value of a bar of gold weighing 32 ounces?

Multiply 12 by 5.

$$\begin{array}{r} 12 \\ \times 5 \\ \hline 60 \end{array}$$



Write five rows of dots with twelve dots in each row; this gives 5 times 12 dots, or 60 dots. In each vertical row there are 5 dots; counting the dots in this way we have 12 times 5 dots, or 60 dots. Hence,  $12 \times 5 = 5 \times 12$ .

By taking any other two numbers we can show in a similar manner that their product is the same no matter which number is taken as multiplier and which as multiplicand.

$5 \times 9 \times 11 = ?$  This means that 5 is to be multiplied by 9, and their product by 11.

$$11 \times 5 \times 9 = ?$$

$$9 \times 11 \times 5 = ?$$

The continued product of several numbers is the same no matter in what order the numbers are written.

When two or more numbers are to be multiplied, these numbers are called **factors** of the product.

A farmer sold four bales of cotton weighing, respectively, 475 pounds, 492 pounds, 480 pounds, and 498

pounds at 8¢ a pound. How much did the farmer receive for his four bales of cotton?

$$\begin{array}{r}
 475 \text{ pounds} \\
 492 \quad " \\
 480 \quad " \\
 498 \quad " \\
 \hline
 1945 \quad " \\
 \quad \quad 8 \\
 \hline
 15560 \quad \text{Ans. \$155.60}
 \end{array}$$

First, find the number of pounds sold; second, multiply the price of 1 pound by the number of pounds.

To multiply 8 by 1945 gives the same result as to multiply 1945 by 8.

We can, therefore, make 1945 the multiplicand and 8 the multiplier. The resulting product will be the number of cents which the cotton brings.

**EXERCISE 37 (Written)**

1. Find the price of 3 bales of cotton weighing, respectively, 500 pounds, 492 pounds, and 512 pounds at 7¢ a pound.
2. A farmer sold 4 round bales of cotton weighing, respectively, 238 pounds, 244 pounds, 240 pounds, and 242 pounds at 7¢ a pound. What did he receive for his cotton?
3. A ship's cargo contained 233,123 pounds of cotton valued at 8¢ a pound. What was the value of the ship's cargo of cotton?
4. A ship's cargo contained 184,000 bushels of wheat valued at 72¢ a bushel. Find the value of the cargo of wheat.
5. The British steamship *Irada* cleared the port of Galveston Sept. 30, 1902, with a cargo containing

16,249 bales of cotton weighing 8,660,717 pounds valued at 8¢ a pound. What was the value of the *Irada's* cargo of cotton?

6. The British steamship *Atlantian* cleared the port of Galveston Oct. 10, 1902, with a cargo containing 18,261 square bales of cotton weighing 9,678,330, and 5,000 round bales of cotton weighing 1,200,000 pounds. Find the value of the cargo at 8¢ a pound.

7. The same steamship carried 2,707 sacks of cotton-seed meal valued at \$1.15 a sack. Find the value of the cotton-seed meal in her cargo.

8. Find the value of 4,480 sacks of cotton-seed meal at \$1.16 a sack.

9. The British steamship *Mount Temple* cleared the port of Galveston Dec. 8, 1902, with 16,400 square bales and 18,400 round bales of cotton, both weighing 12,986,400 pounds. Find the value of the cargo of cotton at 8¢ a pound.

10. Find the value of 17,838 sacks of cotton-seed meal at \$1.15 a sack.

11. Find the cost of 1,580 bushels of oats at 43¢ a bushel.

12. Find the cost of 18,000 feet of lumber at \$21 a thousand feet.

13. A real estate agent sold 640 acres of land at \$12 an acre. How much did the land bring?

14. Find the value of 240 boxes of oranges at \$1.75 a box.

15. A farmer sold 245 barrels of apples at \$1.85 a barrel. What did he get for his apples?

16. A butcher sold 1,872 pounds of beef at 11¢ a pound. What did he receive for the meat?

17. A packing house sold 15,780 pounds of pork at 7¢ a pound. What did the pork bring?

18. A bookseller bought 115 geographies at 45¢ apiece. What was the value of his purchase?

19. The same bookseller bought 237 readers at 35¢ each. How much did he pay for the readers? If he sold these readers for 42¢ each, what was his profit?

20. A clothier buys 150 straw hats at 90¢ each, and sells them at \$1.30 each. How much does he make?

## DIVISION

Divide \$11.75 by 5.

$\frac{5}{\$11.75}$       \$11.75 may be read 11 dollars, 7 dimes, and 5 cents.

$\frac{2.35}{\$11.75}$       The fifth part of \$11 is \$2 and \$1 over. In \$1 there are 10 dimes; 10 dimes and 7 dimes are 17 dimes. The fifth part of 17 dimes is 3 dimes and 2 dimes over. 2 dimes = 20 cents. 20 cents and 5 cents are 25 cents. The fifth part of 25 cents is 5 cents. Therefore, the quotient is 2 dollars, 3 dimes, and 5 cents, or \$2.35.

In working this example we have three partial dividends, 11 dollars, 17 dimes, and 25 cents. Each figure of the quotient is written directly under the right-hand figure of each partial dividend.

## EXERCISE 38 (Written)

Divide by 4:

1. \$8.36; \$7.68; \$11.24; \$19.76; \$21.84;  
\$27.64; \$33.16; \$35.72.

Divide by 5:

2. \$16.20; \$17.85; \$19.95; \$22.65; \$27.10;  
\$32.35; \$39.80; \$37.85.

Divide by 6:

3. \$12.42; \$15.66; \$17.76; \$21.90; \$32.70;  
\$33.84; \$39.24; \$41.04.

Divide by 7:

4. \$17.50; \$21.84; \$25.62; \$29.12; \$31.57;  
\$37.94; \$48.96; \$57.54.

Divide by 8:

5. \$12.64; \$15.92; \$23.84; \$26.88; \$35.92;  
\$42.32; \$49.12; \$59.46.

Divide by 9:

6. \$15.93; \$18.45; \$26.46; \$39.71; \$47.16;  
\$64.26; \$73.17; \$85.59.

7. A man bought 3 pairs of shoes for his children for \$10.50. What did he pay a pair for the shoes?

8. If three tons of coal cost \$25.50, what will 1 ton cost?

9. If 4 calves are sold for \$66.40, what is the price of each calf?

10. A farmer sells 5 sheep for \$33.75. What is the price of each sheep?

11. If a farmer sells 6 bales of cotton for \$241.40, what is the average price per bale?

12. If a trader sells 7 mules for \$591.50, what is the average price of these mules?
13. Suppose 8 pianos are sold for \$1884. Find the average selling price of a piano.
14. When 9 barrels of flour sell for \$60.75, what is the selling price of 1 barrel?
15. When 9 barrels of sugar sell for \$146.25, what is the selling price of 1 barrel?
16. If 8 rugs cost \$148, what is the average cost of a rug?
17. A real estate agent sells 7 town lots for \$1298.50. Find the average selling price of a lot.
18. A real estate agent sells 6 houses for \$7,503. What is the average selling price of these houses?
19. If 9 dozen chickens cost \$32.85, what is the price of chickens per dozen?
20. 9 bushels of wheat were sold for \$7.56. Find the price of a bushel of wheat.
21. Seven thousand feet of lumber cost \$150.50. Find the price of 1000 feet of lumber.
22. A furniture dealer bought 7 dining-room tables, each costing the same amount, for \$194.25. Find the cost of each table.

**EXERCISE 39 (Written)**

1. $\$ 992.25 \div 3 = ?$	4. $\$ 1,049.76 \div 4 = ?$
2. $\$ 1,361.61 \div 3 = ?$	5. $\$ 1,211.04 \div 4 = ?$
3. $\$ 1,568.16 \div 3 = ?$	6. $\$ 1,584.04 \div 4 = ?$

7.  $\$2,061.16 \div 4 = ?$       33.  $\$2,611.21 \div 7 = ?$   
8.  $\$2,323.24 \div 4 = ?$       34.  $\$2,830.24 \div 7 = ?$   
9.  $\$2,480.04 \div 4 = ?$       35.  $\$3,058.09 \div 7 = ?$   
10.  $\$1,122.25 \div 5 = ?$       36.  $\$3,294.76 \div 7 = ?$   
11.  $\$1,260.25 \div 5 = ?$       37.  $\$3,540.25 \div 7 = ?$   
12.  $\$1,560.25 \div 5 = ?$       38.  $\$3,794.56 \div 7 = ?$   
13.  $\$2,256.25 \div 5 = ?$       39.  $\$4,238.01 \div 7 = ?$   
14.  $\$2,450.25 \div 5 = ?$       40.  $\$2,381.44 \div 8 = ?$   
15.  $\$2,756.25 \div 5 = ?$       41.  $\$2,540.16 \div 8 = ?$   
16.  $\$1,814.76 \div 6 = ?$       42.  $\$2,872.96 \div 8 = ?$   
17.  $\$1,971.36 \div 6 = ?$       43.  $\$3,047.04 \div 8 = ?$   
18.  $\$2,079.36 \div 6 = ?$       44.  $\$3,226.24 \div 8 = ?$   
19.  $\$2,246.76 \div 6 = ?$       45.  $\$3,410.56 \div 8 = ?$   
20.  $\$2,480.04 \div 6 = ?$       46.  $\$3,504.64 \div 8 = ?$   
21.  $\$2,981.16 \div 6 = ?$       47.  $\$3,696.64 \div 8 = ?$   
22.  $\$3,180.96 \div 6 = ?$       48.  $\$3,014.01 \div 9 = ?$   
23.  $\$3,528.36 \div 6 = ?$       49.  $\$3,214.89 \div 9 = ?$   
24.  $\$3,745.44 \div 7 = ?$       50.  $\$3,422.25 \div 9 = ?$   
25.  $\$4,044.96 \div 6 = ?$       51.  $\$3,636.09 \div 9 = ?$   
26.  $\$4,199.04 \div 6 = ?$       52.  $\$4,316.49 \div 9 = ?$   
27.  $\$1,823.29 \div 7 = ?$       53.  $\$4,678.56 \div 9 = ?$   
28.  $\$1,944.81 \div 7 = ?$       54.  $\$4,928.04 \div 9 = ?$   
29.  $\$2,070.25 \div 7 = ?$       55.  $\$5,314.41 \div 9 = ?$   
30.  $\$2,199.61 \div 7 = ?$       56.  $\$5,715.36 \div 9 = ?$   
31.  $\$2,332.89 \div 7 = ?$       57.  $\$5,990.76 \div 9 = ?$   
32.  $\$2,470.09 \div 7 = ?$       58.  $\$6,272.64 \div 9 = ?$

59. $\$6,707.61 \div 9 = ?$	69. $\$5,715.36 \div 7 = ?$
60. $\$7,005.69 \div 9 = ?$	70. $\$5,994.24 \div 7 = ?$
61. $\$7,310.25 \div 9 = ?$	71. $\$6,368.04 \div 7 = ?$
62. $\$7,779.24 \div 9 = ?$	72. $\$6,593.44 \div 7 = ?$
63. $\$8,262.81 \div 9 = ?$	73. $\$6,822.76 \div 7 = ?$
64. $\$8,593.29 \div 9 = ?$	74. $\$6,658.56 \div 8 = ?$
65. $\$8,930.25 \div 9 = ?$	75. $\$6,922.24 \div 8 = ?$
66. $\$9,273.69 \div 9 = ?$	76. $\$7,464.96 \div 8 = ?$
67. $\$5,097.96 \div 7 = ?$	77. $\$7,814.56 \div 8 = ?$
68. $\$5,299.84 \div 7 = ?$	78. $\$8,537.76 \div 8 = ?$

## LONG DIVISION

Divide  $\$2,190.24$  by 156.

$$\begin{array}{r}
 \$14.04 \\
 156) \$2,190.24 \\
 \underline{156} \\
 630 \\
 \underline{624} \\
 624 \\
 \underline{624}
 \end{array}$$

The first partial dividend is 219. 156 is contained in 219 1 time. Write the 1 directly over the right-hand figure of the partial dividend. Multiply the divisor by 1 and subtract the product from 219.

Bring down the next figure, 0. 156 is contained in 630, the next partial dividend, 4 times. Write 4 over the right-hand figure of the partial dividend. Multiply the divisor by 4 and subtract the product from 630. Bring down the next figure, 2. 156 is not contained in 62. Write 0 in the quotient over 2, the figure brought down. Bring down the

next figure, 4. 156 is contained in 624 4 times. Write 4 over the 4 brought down. The decimal point in the quotient is written in the same vertical column as the decimal point in the dividend. The answer is \$14.04.

**EXERCISE 40 (Written)**

Divide:

1. \$47.61 by 23.
2. \$57.76 by 38.
3. \$60.84 by 13.
4. \$70.56 by 14.
5. \$92.16 by 16.
6. \$98.01 by 33.
7. \$92.16 by 24.
8. \$56.25 by 25.
9. \$148.84 by 61.
10. \$163.84 by 32.
11. \$201.64 by 71.
12. \$216.09 by 49.
13. \$237.16 by 77.
14. \$268.96 by 82.
15. \$295.84 by 43.
16. \$309.76 by 88.
17. \$345.96 by 62.
18. \$368.64 by 64.
19. \$380.25 by 39.
20. \$392.04 by 66.
21. \$316.84 by 89.
22. \$345.96 by 93.
23. \$416.16 by 68.
24. \$432.64 by 52.
25. \$449.44 by 53.
26. \$453.69 by 71.
27. \$510.76 by 113.
28. \$3,047.04 by 184.
29. \$3,283.29 by 191.
30. \$3,457.44 by 196.
31. \$3,226.24 by 284.
32. \$3,317.76 by 288.
33. \$3,387.24 by 291.
34. \$3,540.25 by 119.
35. \$3,387.24 by 194.
36. \$3,696.64 by 304.
37. \$3,943.84 by 314.
38. \$4,070.44 by 319.
39. \$4,160.25 by 215.
40. \$4,199.04 by 324.

41. \$4,329.64 by 329.      54. \$8,154.09 by 301.  
42. \$4,515.84 by 224.      55. \$8,262.81 by 303.  
43. \$4,651.24 by 341.      56. \$8,593.29 by 309.  
44. \$4,678.56 by 228.      57. \$8,723.56 by 467.  
45. \$4,816.36 by 347.      58. \$8,930.25 by 315.  
46. \$4,844.16 by 232.      59. \$8,987.04 by 134.  
47. \$4,872.04 by 349.      60. \$9,120.25 by 191.  
48. \$5,241.76 by 362.      61. \$9,177.64 by 479.  
49. \$5,446.44 by 246.      62. \$9,254.44 by 481.  
50. \$5,565.16 by 373.      63. \$9,389.61 by 323.  
51. \$6,464.16 by 402.      64. \$9,525.76 by 488.  
52. \$7,673.76 by 438.      65. \$9,682.56 by 492.  
53. \$7,992.36 by 447.      66. \$9,920.16 by 498.  
67. A commission merchant sold 1,508 bales of cotton for \$56,851.60. Find the average price per bale.  
68. A dealer sold 48 farm wagons for \$2,870.40. What was the average selling price of the wagons?  
69. A dealer sold 17 horses for \$2,123.30. What was the average price at which the horses were sold?  
70. A man sold 273 barrels of apples for \$745.29. Find the selling price of the apples per barrel.  
71. A farmer bought 336 acres of land for \$4,515.84. What did the land cost per acre?  
72. A grain merchant sold 25 carloads of wheat for \$5,437.50. What was the value of a carload of wheat?

How often is \$1.45 contained in \$36.25?

Divisor, \$1.45 = 145¢.. 25

Dividend, \$36.25 = 3625¢. 145)3625

\$1.45 is contained in \$36.25 as many times as 145¢ is contained in 3625¢, or as many times as the number 145 is contained in the number 3625. The answer is 25 times.

**EXERCISE 41 (Written)**

1. How many pairs of shoes at \$2.25 a pair can be bought for \$9.00?
2. How many pounds of sugar at 5¢ a pound can be bought for \$1.35?
3. How many pounds of tea at 55¢ a pound can be bought for \$60.50?
4. How many pounds of coffee at 18¢ a pound can be bought for \$6.48?
5. How many hats at \$2.15 apiece can be bought for \$27.95?
6. If the price of oats is 28¢ a bushel, how many bushels can be bought for \$15.68?
7. If the price of corn is 48¢ a bushel, how many bushels can be bought for \$67.20?
8. A clothier bought a number of suits of clothes at \$15.50 a suit, and paid \$480.50. How many suits did he buy?
9. A farmer bought a farm for \$2,200, paying \$27.50 an acre. How many acres were in the farm?

10. A live-stock commission merchant bought for \$3,120.50 a number of cattle at \$39.50 a head. How many cattle did he buy?

11. A coal dealer bought for \$2,925, at \$6.50 a ton, a quantity of coal. How many tons did he buy?

How many times is:

12. 14¢ contained in \$7.84?
13. 8¢ contained in \$10.24?
14. 7¢ contained in \$12.25?
15. 9¢ contained in \$12.96?
16. 13¢ contained in \$15.21?
17. 11¢ contained in \$43.56?
18. 12¢ contained in \$51.84?
19. 15¢ contained in \$56.25?
20. 9¢ contained in \$65.61?
21. 8¢ contained in \$100.00?
22. 4¢ contained in \$250.00?
23. 16¢ contained in \$92.16?
24. 7¢ contained in \$96.04?
25. 11¢ contained in \$98.12?
26. 19¢ contained in \$90.44?
27. 23¢ contained in \$84.64?
28. 84¢ contained in \$141.12?
29. 47¢ contained in \$44.18?
30. 56¢ contained in \$125.44?
31. \$1.01 contained in \$918.09?
32. \$1.09 contained in \$594.05?

33. \$1.25 contained in \$1,000.00?
34. \$1.52 contained in \$924.16?
35. \$1.79 contained in \$1,602.05?
36. \$2.67 contained in \$1,425.78?
37. \$2.79 contained in \$2,335.23?
38. 59¢ contained in \$870.25?
39. 69¢ contained in \$7,617.60?
40. 96¢ contained in \$8,880.00?
41. 13¢ contained in \$9,009.00?
42. 11¢ contained in \$9,009.00?
43. \$1.43 contained in \$9,009.00?
44. \$2.99 contained in \$2,682.03?
45. \$3.60 contained in \$7,776.00?
46. \$3.70 contained in \$9,583.00?
47. \$3.84 contained in \$7,372.80?
48. \$1.94 contained in \$1,505.44?
49. \$3.90 contained in \$7,605.00?
50. \$4.10 contained in \$15,129.00?
51. \$4.43 contained in \$5,887.47?
52. \$5.07 contained in \$12,852.45?
53. \$6.07 contained in \$18,422.45?
54. 25¢ contained in \$250.00?
55. 75¢ contained in \$22,500.75?
56. \$1.50 contained in \$10,500.00?
57. \$1.75 contained in \$35,000.00?
58. \$6.25 contained in \$7,812.50?

59. \$ 6.70 contained in \$22,445.00?
60. \$ 7.07 contained in \$24,992.45?
61. \$ 8.80 contained in \$69,696.00?
62. \$ 1.98 contained in \$9,801.00?
63. \$ 4.83 contained in \$9,331.56?

## REVIEW

## EXERCISE 42 (Written)

1. The amount of sugar consumed in the United States in the years from 1895 to 1900, inclusive, was as follows:

1895	.	.	.	.	1,949,744 tons.
1896	.	.	.	.	1,960,086 tons.
1897	.	.	.	.	2,070,978 tons.
1898	.	.	.	.	2,200,902 tons.
1899	.	.	.	.	2,078,068 tons.
1900	.	.	.	.	2,919,848 tons.

How many tons of sugar were consumed in the six years?

2. How many more tons of sugar were consumed in 1896 than in 1895?
3. How many more tons of sugar were consumed in 1897 than in 1896?
4. How many more tons of sugar were consumed in 1898 than in 1899?
5. How many more tons of sugar were consumed in 1900 than in 1897?

6. The railroad mileage, at the end of the year 1900, of the countries of Europe was as follows:

Germany	.	.	.	.	31,933 miles.
Austria	.	.	.	.	22,917 miles.
Great Britain	.	.	.	.	21,864 miles.
France	.	.	.	.	26,611 miles.
Russia	.	.	.	.	29,892 miles.
Italy	.	.	.	.	9,810 miles.
Belgium	.	.	.	.	3,943 miles.
Netherlands	.	.	.	.	1,994 miles.
Switzerland	.	.	.	.	2,351 miles.
Spain	.	.	.	.	8,300 miles.
Portugal	.	.	.	.	1,476 miles.
Denmark	.	.	.	.	1,865 miles.
Norway	.	.	.	.	1,286 miles.
Sweden	.	.	.	.	7,034 miles.
Servia	.	.	.	.	359 miles.
Roumania	.	.	.	.	1,925 miles.
Greece	.	.	.	.	605 miles.
Turkey	.	.	.	.	1,952 miles.
Isle of Man, Malta, Jersey	.	.	.	.	68 miles.

Find number of miles of railroad in Europe.

7. The total number of miles of railroad in the United States at the end of the year 1900 was 193,304 miles. How many more miles of railroad were in the United States than in all of Europe?

8. How many more miles of railroad were in the United States than in Germany? Austria? Great Britain? France? Russia?

9. Omaha, Nebraska, is 1,383 miles distant from New York. A man leaves Omaha for New York City, traveling at the rate of 31 miles an hour. How far will he be from New York City at the end of 24 hours?

10. Milwaukee is 85 miles from Chicago. A man leaves Chicago for Milwaukee on a bicycle, traveling at the rate of 9 miles an hour. How far will he be from Milwaukee at the end of 6 hours?

11. Yokohama is 5,140 miles from San Francisco. A steamer makes the voyage from San Francisco to Yokohama in 374 hours. Find the average rate of the ship per hour.

12. Glasgow is 3,375 miles from New York City. A steamer makes the voyage between these cities in 9 days. Find the steamer's average rate per hour.

13. The postal distance between New York City and New Orleans is 1,344 miles. The postal time is 40 hours. Find the average rate per hour.

14. The time of mail transit between New York City and St. Louis is 29 hours. The distance is 1,048 miles. Find the average rate of the mail train between these cities.

15. A farmer buys 85 acres of land from his neighbor at \$56.50 an acre and sells it to another neighbor at \$60 an acre. How much does he make?

16. A speculator buys 950 bushels of wheat at 79¢ a bushel, and sells it at 81¢ a bushel. How much does he gain?

17. A dry goods merchant buys 150 dress skirts at \$6.75 each, and sells them at \$8.00 apiece. Find his total profit.

18. A shoe dealer buys 250 pairs of shoes at \$1.69 a pair, and sells them at \$2.00 a pair. How much profit does he make?

19. A farmer bought 105 sheep at \$3.50 a head ; he spent for feed for the sheep \$112.50, and then sold them at \$5.25 a head. How much did he make?

20. A farmer bought 75 head of cattle at \$25 a head ; he paid \$3.50 a head for 4 months' pasturage ; he then sold the cattle for \$30.00 a head. How much did he make?

21. If the divisor is 15 and the quotient is 37, what is the dividend?

22. What number must be added to the sum of 324 and 439 to make 1,000?

23. By what number must 36 be multiplied to give for product 2,592?

24. By what number must 686 be divided to give for quotient 14?

25. An estate is divided among 5 boys, each one getting \$712.50. What is the value of the estate?

26. A box of oranges sold for \$5. How many oranges were in the box, if each orange brought 2¢?

27. By selling sheep at a profit of \$1.50 a head, a man makes a profit of \$21.00 in all. How many sheep does he sell?

28. How many tons of hay at \$10.50 a ton must I sell to pay for 200 bushels of wheat at 84¢ a bushel?

29. How many bushels of oats at 34¢ a bushel must be sold to pay for a suit of clothes costing \$8.50?

30. How many bushels of corn at 45¢ a bushel will pay for a mule worth \$67.50?

### BILLS

A bill is a written statement of articles sold, giving the price of each and the number of articles, or a statement of services rendered.

#### SPECIMEN BILL

ATLANTA, GA., May 1, 1903.

Mr. James Henry,

In Account with WILLIAM MERCHANT & COMPANY,  
WHOLESALE AND RETAIL GROCERS.

April	3	1 ham, 18 lb.	@ 15¢	\$2	70
"	5	5 doz. cans of tomatoes	@ 95¢	4	75
"	"	17 lb. sugar	@ 5¢		85
"	"	5 lb. tea	@ 60¢	3	00
"	"	10 lb. coffee	@ 30¢	3	00
"	"	5 pk. potatoes	@ 20¢	1	00
"	8	2 sacks flour	@ \$1.50	3	00
"	8	3 doz. cans asparagus	@ 1.65	4	95
"	12	3 packages cream of tartar	@ 25¢		75
"	15	5 lb. mincemeat	@ 30¢	1	50
				\$24	50

May 1, 1903.

Received payment,

William Merchant & Company.

RICHMOND, VA., March 1, 1903.

Mr. John Wilkins,

## BOUGHT OF THE PEOPLE'S STORE.

Feb.	4	2 parasols	@ 90¢	\$ 1	80
"	5	3 pairs hose	@ 50¢	1	50
"	"	2 pairs shoes	@ \$3.50	7	00
"	10	2 shirt waists	@ 1.75	3	50
"	15	3 lace curtains	@ 2.50	7	50
"	20	1 skirt	@ 7.50	7	50
"	25	10 yd. bleached domestic	@ 12¢ yd.	1	20
"	27	2 mosquito bars	@ \$3.50	7	00

Copy the above bill, find the amount, and receipt it.

DALLAS, TEXAS, Sept. 1, 1902.

Mr. Wilbur Smith,

BOUGHT OF  
THE NORTH TEXAS HARDWARE COMPANY.

Aug.	17	3 axes	@ \$1.25		
"	"	4 saws	@ 1.35		
"	"	7 hatchets	@ 90¢		
"	20	40 lb. nails	@ 6¢		
"	"	4 doz. door hinges	@ \$1.60		
"	23	3 knives	@ 75¢		
"	25	6 doz. screws	@ 12¢		
"	29	3 razors	@ \$1.50		

Copy, find the amount, and receipt.

WICHITA, KANSAS, December 1, 1902.

*Mr. Oliver Orton,*

BOUGHT OF

THE SOUTH KANSAS IMPLEMENT COMPANY.

Nov.	10	2 wagons	@ \$ 65.00		
"	"	3 plows	@ 7.50		
"	"	3 harrows	@ 5.75		
"	15	4 pairs harness	@ 18.50		
"	20	3 robes	@ 6.50		

*Thos. Jones,*

To WILLIAM LITTLE, DR.

		5 days' work	@ \$ 3.20		
		5,000 ft. lumber	@ 18.50 per M		
		50 lb. nails	@ 5¢		
		8 pairs hinges	@ 75¢ a pair		
		5 locks	@ 90¢		

*Mr. William Lyle,*

BOUGHT OF F. D. STONER &amp; COMPANY.

		20 yd. ingrain carpet	@ 75¢		
		40 yd. matting	@ 60¢		
		2 chiffoniers	@ \$ 10.50		
		1 extension table	@ 24.50		
		1 center table	@ 3.75		
		4 rocking chairs	@ 6.75		
		1 kitchen safe	@ 7.50		
		1 couch	@ 36.50		
		2 lawn swings	@ 5.75		
		4 iron beds	@ 8.50		

Copy, find amounts, and receipt above bills.

## MISCELLANEOUS EXERCISE 43. REVIEW

Subjoined is given the land and water areas of the thirteen original states in square miles.

NAME	WATER AREA	LAND AREA
New Hampshire . . . . .	300 sq. miles	9,005 sq. miles
Massachusetts . . . . .	275 sq. miles	8,040 sq. miles
Rhode Island . . . . .	197 sq. miles	1,053 sq. miles
Connecticut . . . . .	145 sq. miles	4,845 sq. miles
New York . . . . .	1,550 sq. miles	47,620 sq. miles
New Jersey . . . . .	290 sq. miles	7,525 sq. miles
Pennsylvania . . . . .	230 sq. miles	44,985 sq. miles
Delaware . . . . .	90 sq. miles	1,960 sq. miles
Maryland . . . . .	2,350 sq. miles	9,860 sq. miles
Virginia . . . . .	2,325 sq. miles	40,125 sq. miles
North Carolina . . . . .	3,670 sq. miles	48,580 sq. miles
South Carolina . . . . .	400 sq. miles	30,170 sq. miles
Georgia . . . . .	495 sq. miles	58,980 sq. miles

1. Find the total area of each of the above-mentioned states.
2. Find the total area of water surface of the thirteen original states.
3. Find the total land area of the thirteen original states.
4. A square mile contains 640 acres. Express the land area of each of the thirteen original states in acres.
5. Find the number of acres in the combined area of the thirteen original states.

The following table gives the population of the cities named in 1890 and in 1900:

NAME	1890	1900
San Antonio, Texas	37,673	53,321
Manchester, N.H.	44,126	56,987
Evansville, Ind.	50,756	59,007
Springfield, Mass.	44,179	62,059
Oakland, Cal.	48,682	66,960
Bridgeport, Conn.	48,866	70,996
Reading, Pa.	58,661	78,961
Seattle, Wash.	42,837	80,671
Richmond, Va.	81,388	85,050
Portland, Me.	36,425	50,145
Youngstown, Ohio	33,220	44,885
Brockton, Mass.	27,294	40,036
Tacoma, Wash.	36,006	37,714
Allentown, Pa.	25,228	35,416

6. Find the increase in population in each of the above cities.

7. How far will a train run in 9 hr. at 29 miles an hour? At 34 miles an hour? At 37 miles an hour? At 43 miles an hour?

8. A bicyclist rides at the rate of  $9\frac{2}{3}$  miles an hour. How far will he go in 3 hr.? In 4 hr.?

Find the cost of the following articles:

9. 95 bbl. apples @ \$2.30 per bbl.

10. 87 bu. wheat @ 93¢ per bu.

11. 49 bu. barley @ 76¢ per bu.

12. 56 bu. oats @ 48¢ per bu.

13. 19 bu. potatoes @ 97¢ per bu.
14. 34 bales cotton @ \$47.50 per bale.
15. 24 sacks cotton-seed meal @ \$1.82 per sack.
16. 7 sacks of pecans @ \$ 5.85 per sack.
17. 23 tons of hay @ \$ 15.60 per ton.
18. 16 cords of wood @ \$ 4.80 per cord.
19. 18 boxes oranges @ \$ 1.85 per box.
20. 37 boxes lemons @ \$ 2.25 per box.
21. 56 bunches bananas @ 55¢ per bunch.
22. 18 bbl. flour @ \$ 5.70 per bbl.
23. 25 sacks bran @ \$1.40 per sack.
24. 84 bu. sweet potatoes @ 95¢ per bu.
25. 28 tons coal @ \$ 7.70 per ton.
  
26. An orchard has 26 rows of trees and 58 trees in each row. How many trees are in the orchard?
27. A cornfield has 96 rows of corn, and 583 hills in a row. How many hills are in the field?
28. A boy earns \$ 3.45 per week. How much will he earn in 21 weeks?
29. What number divided by 8 will give a quotient of 5? Will give a quotient of 19? Will give a quotient of 78?
30. How many shoes are required for 9 span of horses?
31. How many legs have 9 spiders?

32. How often can you subtract 8 from 32 ? From 64 ? From 96 ? From 120 ?
33. How often can you subtract 25 from 175 ? 225 ? 3,275 ?
34. Two trains start from the same place and travel in opposite directions at the rates of 18 and 30 miles per hour respectively. How far apart will they be in 8 hours ? In 14 hours ?
35. A stock jobber bought 67 horses at \$ 94 apiece and sold them at \$ 115 apiece. What was his total gain ?
36. 63 acres of land are bought at \$ 47 an acre, and sold at \$ 56 an acre. Find the total gain.
37. How long will it take a man to save \$ 361, if he saves \$ 9.50 a week ?
38. How long will it take a carrier pigeon to fly 576 miles at the rate of 48 miles an hour ?
39. How many pairs of shoes can be bought for \$ 42.00 at \$ 3.50 a pair ?
40. How many lambs can be bought for \$ 81 at \$ 2.25 per head ?
41. A steamboat runs 13 miles an hour. How long will it take to run 507 miles ?
42. Find the difference between 63 times 65 and 62 times 66.
43. Find the difference between 76 times 89 and 77 times 88.

44. Find the difference between 96 times 76 and 97 times 75.

45. Express in Roman notation: 44; 76; 88; 113; 129; 147; 200; 325; 555; 666; 1775; 1898.

46. Gates Thomas sold 537 lb. pecans at 5¢ per lb. How much did the pecans bring?

47. A square has an area of 25 square yards. How many yards are in one side?

48. Find the number of yards in a side of a square whose area is 49 sq. yd.; 81 sq. yd.; 144 sq. yd.; 1600 sq. yd.; 3600 sq. yd.

49. A floor is 16 ft. by 14 ft. A rug 12 ft. by 14 ft. is placed on it. The remainder of the floor is stained. Find the area of the surface stained. Find the cost of staining it at 5¢ per square foot.

50.  $\frac{1}{2}$  of 22 = ?       $\frac{1}{3}$  of 39 = ?       $\frac{1}{4}$  of 72 = ?

51.  $\frac{2}{5}$  of 90 = ?       $\frac{5}{6}$  of 144 = ?       $\frac{1}{7}$  of 84 = ?

52.  $\frac{2}{7}$  of 98 = ?       $\frac{2}{9}$  of 153 = ?       $\frac{5}{9}$  of 261 = ?

53. Two cows are bought for \$70. Find the price of one of the cows. Find the price of 5 such cows.

54. Two bbl. flour cost \$9.50. Find the cost of 3 bbl. Find the cost of 5 bbl. Find the cost of 7 bbl.

55. Three pairs of shoes cost \$11.25. Find the cost of 5 pairs. Find the cost of 13 pairs.

56. When oranges sell for 30¢ per dozen, what ought one to pay for 4 oranges? For 14 oranges? For 18 oranges? For 28 oranges?

## PART III

### FACTORS

1. $2 \times 3 \times 5 = ?$	6. $3 \times 3 \times 5 = ?$
2. $3 \times 5 \times 7 = ?$	7. $6 \times 8 \times 12 = ?$
3. $4 \times 8 \times 9 = ?$	8. $7 \times 11 \times 13 = ?$
4. $2 \times 5 \times 10 = ?$	9. $7 \times 11 \times 17 = ?$
5. $1 \times 2 \times 3 \times 4 = ?$	10. $1 \times 2 \times 3 \times 4 \times 5 \times 6 = ?$

A product is the result obtained by multiplying two or more numbers.

The numbers which produce a product are called the factors of the product. Thus, 4 and 6 are factors of 24. So, also, are 3 and 8, 2 and 12, and 2, 2, 2, and 3, factors of 24.

#### EXERCISE 1 (Oral)

1. Name two pairs of factors of 18; 20; 28; 16; 12; 30; 32.
2. Name three pairs of factors of 36; 42; 48; 56; 72; 60; 40; 80.
3. Name two factors of 9; 15; 21; 22; 25; 33; 35; 38; 39; 44; 45; 46.
4. Name two factors of 51; 52; 54; 57; 64; 72; 75; 76; 78; 84; 55.

A prime number, or a prime factor, is a number whose only factors are itself and 1. Thus, 2, 3, 5, 7, 11, 13 are prime numbers, or prime factors.

5. Name the prime factors of 6 ; 9 ; 10 ; 12 ; 14 ; 16 ; 15 ; 18 ; 20 ; 21.
6. Name the prime factors of 22 ; 24 ; 25 ; 26 ; 27 ; 28 ; 30 ; 32 ; 33 ; 34.
7. Name the prime factors of 35 ; 38 ; 39 ; 40 ; 42 ; 44 ; 45 ; 46 ; 48 ; 49.
  - a. Name the prime factors of 51 ; 52 ; 54 ; 55 ; 56 ; 58 ; 60 ; 62 ; 63 ; 64.
9. Name two common factors of 8 and 12 ; 12 and 18 ; 18 and 27 ; 16 and 24.
10. Name two common factors of 10 and 20 ; 24 and 30 ; 30 and 36 ; 30 and 40.
11. Name two common factors of 24 and 32 ; 48 and 56 ; 40 and 48.
12. Name two common factors of 27 and 36 ; 36 and 48 ; 60 and 72.

#### MEASURES AND MULTIPLES

Any factor of a number is called a **measure** of that number.

Any common factor of two or more numbers is called a **common measure** of those numbers.

The **greatest common measure** of two or more numbers is the greatest factor common to the numbers. Thus, 4 is the greatest common measure of 8 and 12 ;

6 is the greatest common measure of 12 and 18 ; 9 is the greatest common measure of 18 and 27.

The letters G. C. M. stand for greatest common measure.

**EXERCISE 2 (Oral)**

What is the G. C. M. of :

1. 6 and 9?	6. 8 and 16?	11. 20 and 30?
2. 6 and 12?	7. 16 and 24?	12. 30 and 40?
3. 4 and 8?	8. 27 and 36?	13. 36 and 45?
4. 18 and 24?	9. 24 and 32?	14. 32 and 40?
5. 12 and 24?	10. 32 and 40?	15. 45 and 54?
	16. 48 and 56?	

(i.) Multiply 6 by each of the numbers, 1, 2, 3, 4, 5, 6, 7, etc.

(ii.) Multiply 7 by each of the numbers, 1, 2, 3, 4, 5, 6, 7, etc.

The products in example (i.) are called **multiples** of 6.

The products in example (ii.) are called **multiples** of 7.

A **multiple** of a number is the product obtained by multiplying the number by some other number.

(a) A few of the multiples of 6 are 12, 18, 24, 30, 36.

(b) A few of the multiples of 9 are 18, 27, 36, 45, 54.

Name two common multiples of 6 and 9.

What is the least common multiple of 6 and 9?

**EXERCISE 3**

Find the least common multiple of :

1. 6 and 8.	9. 16 and 20.	17. 3 and 4.
2. 8 and 12.	10. 18 and 27.	18. 7 and 8.
3. 12 and 18.	11. 12 and 20.	19. 8 and 14.
4. 9 and 12.	12. 16 and 6.	20. 14 and 4.
5. 5 and 6.	13. 16 and 12.	21. 15 and 18.
6. 6 and 10.	14. 16 and 24.	22. 15 and 20.
7. 4 and 10.	15. 8 and 10.	23. 18 and 24.
8. 5 and 10.	16. 10 and 12.	24. 8 and 28.

**EXERCISE 4 (Written). REVIEW**

1. How many steps of 2 ft. each will a boy take in going 240 ft. ?
2. If a boy takes 70 steps of 2 ft. each in one minute, at this rate how far will he walk in 1 hr. ?
3. A room is 16 ft. by 12 ft. and 9 ft. high. How many square ft. are in the floor ? In the ceiling ? In each of the four walls ? How many square ft. are in the four walls and ceiling ?
4. A lot is 124 ft. long and 48 ft. wide. How many sq. ft. are in the lot ?
5. How many sq. ft. are in a square whose side is 9 ft. ?
6. What are the two equal factors of 81 ?
7. How many sq. ft. are in a square whose side is 11 ft. ?

8. A railroad car has a capacity of 60,000 lb. Express this in tons of 2,000 pounds each.
9. I can buy 3 acres of land for \$198. At this rate what should I pay for 1 acre? For 20 acres?
10. Four tons of hay cost \$54. Find the cost of 5 tons at the same rate. Find the cost of 9 tons at this rate.
11. The railroad fare in Texas is 3¢ a mile. What is the cost of a railroad ticket for a trip of 315 miles? For 567 miles?
12. At \$5.70 a linear foot, how much will it take to pave a street 635 ft. long?
13. A carpenter earns 40¢ an hour and works 8 hours a day. How much will he earn in 25 working days?
14. A bricklayer makes 60¢ an hour and works 8 hours a day. How much will he earn in 18 days?
15. A family bought 3 pt. of milk at 4¢ a pt. during the months of March, April, and May. Find the amount of the milk bill for the three months.
16. How many rails, each 33 ft. long, will extend one mile (1 mile = 5,280 feet)?
17. How many boards, each 12 ft. long, will be required to fence a lot 132 ft. long and 48 ft. wide, if the fence is three boards high?
18. How many feet of barbed wire will be required to fence a lot 450 ft. long and 239 ft. wide, if the fence has five wires on each post?

19. A man pays \$420 a year for house rent. What is his rent for one month? For 5 months? For 9 months?

20. A man earns a salary of \$90 a month, and spends \$42 a month. How much will he save in 6 months? In 11 months?

21. A newsboy buys papers at 3¢ apiece and sells them at 5¢ apiece. How many must he sell to make a profit of \$1?

22. A clerk sold 7 yd. of cloth at 75¢ a yd., 3 pairs of shoes at \$3.50 a pair. What was the amount of his sales? What change should he give, if he received in payment a twenty-dollar bill?

23. Find the cost of a 16-lb. ham at 22¢ a pound.

24. When 2 lb. of lard are sold for 25¢, find the cost of 6 lb.

25. The cost of water in a certain city is 23¢ a hundred cubic feet. What should be the monthly water bill of a family that consumes 900 cubic feet?

26. The cost of pine lumber is \$34.50 a thousand feet. Find the cost of 18,000 feet.

27. Find the cost of 29,000 feet of lumber at \$27.80 a thousand feet.

28. Find the cost of 16,000 bricks at \$19.60 per thousand brick.

29. When the cost of water is 19¢ per hundred cubic feet, what should be the cost of 1550 cubic feet of water?

## FRACTIONS

If any one thing is divided into three equal parts, one of the parts is called one third of it. Two of the parts are called two thirds of it. Three of the parts are called three thirds of it.

How many inches are in one third of a foot? How many inches are in two thirds of a foot? How many inches are in three thirds of a foot?

How many inches are in one third of a yard? How many inches are in two thirds of a yard?

What is one third of \$9.00? What is two thirds of \$9.00? What is one third of 15¢? What is two thirds of 15¢?

What is one third of 24? What is two thirds of 24? How many minutes are in one third of an hour?

What is one third of 18? What is two thirds of 18?

How many inches are in one half of a yard?

How many inches are in two halves of a yard?

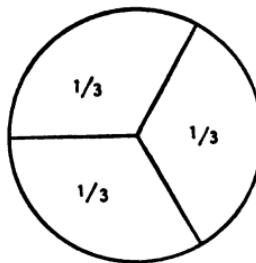
How many inches are in three halves of a yard?

How many seconds are in one half of a minute?

How many seconds are in two halves of a minute?

How many seconds are in three halves of a minute?

How many minutes are there in one third of an



hours? How many hours are in one third of a day? How many hours are in two thirds of a day?

If any one thing is divided into four equal parts, one of the parts is called one fourth of it. Two of the parts are called two fourths of it. Three of the parts are called three fourths of it. How many fourths are in one thing?

How many inches are in one fourth of a foot? How many inches are in two fourths of a foot? How many inches are in three fourths of a foot?

How many inches are in one fourth of a yard? How many inches are in two fourths of a yard? How many inches are in three fourths of a yard?

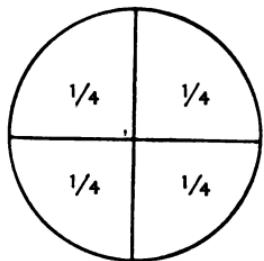
How many hours are in one fourth of a day? How many hours are in two fourths of a day? How many hours are in three fourths of a day?

How many minutes are in one fourth of an hour? How many minutes are in two fourths of an hour? How many minutes are in three fourths of an hour?

How many quarts are in one fourth of a bushel? How many quarts are in two fourths of a bushel? How many quarts are in three fourths of a bushel?

How many pints are in one fourth of a gallon? How many pints are in two fourths of a gallon? How many pints are in three fourths of a gallon?

What is one fourth of 28? What is two fourths of 28? What is three fourths of 28?



What is one half of 16? What is two fourths of 16?

What is one half of 24? What is two fourths of 24?

How does one half compare with two fourths?

If any one thing is divided into five equal parts, one of the parts is called one fifth of it. Two of the parts are called two fifths of it.

Three of the parts are called three fifths of it. Four of the parts are called four fifths of it.

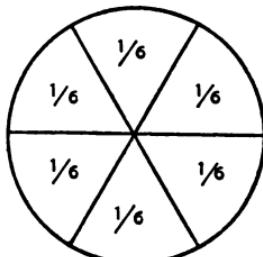
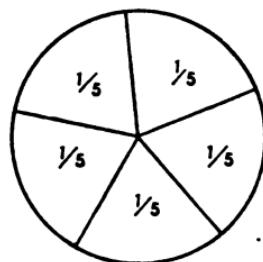
How many cents are in one fifth of a dollar? How many cents are in two fifths of a dollar? How many cents are in three fifths of a dollar? How many cents are in four fifths of a dollar?

How many minutes are in one fifth of an hour? How many minutes are in two fifths of an hour? How many minutes are in three fifths of an hour? How many minutes are in four fifths of an hour?

What is one fifth of 20? What is two fifths of 20? What is three fifths of 20? What is four fifths of 20?

What is one sixth of one yard?  
What is two sixths of one yard?  
What is three sixths of one yard?  
What is four sixths of one yard?  
What is five sixths of one yard?

There are 60 seconds in one minute. How many seconds are in one sixth of a minute? How many seconds are



in two sixths of a minute? How many seconds are in three sixths of a minute? How many seconds are in four sixths of a minute? How many seconds are in five sixths of a minute?

What is one sixth of 30? What is two sixths of 30? What is three sixths of 30? What is four sixths of 30? What is five sixths of 30? What is three sixths of 24? What is one half of 24? How do one half and three sixths compare?

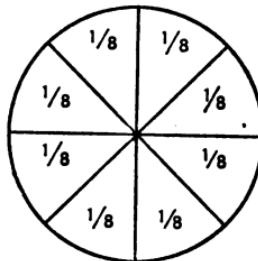
What is two sixths of 24? What is one third of 24? How does two sixths compare with one third?

How many quarts are in one eighth of a bushel? How many quarts are in two eighths of a bushel? How many quarts are in three eighths of a bushel? How many quarts are in four eighths of a bushel? How many quarts are in five eighths of a bushel? How many quarts are in six eighths of a bushel? How many quarts are in seven eighths of a bushel?

What is one eighth of 48? What is two eighths of 48? What is three eighths of 48? What is four eighths of 48? What is five eighths of 48? What is six eighths of 48? What is seven eighths of 48?

What is two eighths of 64? What is one fourth of 64? How does two eighths of a number compare with one fourth of the same number?

What is four eighths of 72? What is one half of



72? How does four eighths of a number compare with one half of the same number?

What is six eighths of 40? What is three fourths of 40? How does six eighths of a number compare with three fourths of the same number?

### NOTATION

One half is written $\frac{1}{2}$ .	One fifth is written $\frac{1}{5}$ .
Two halves is written $\frac{2}{2}$ .	Three fifths is written $\frac{3}{5}$ .
Three halves is written $\frac{3}{2}$ .	One sixth is written $\frac{1}{6}$ .
One third is written $\frac{1}{3}$ .	Three sixths is written $\frac{3}{6}$ .
Two thirds is written $\frac{2}{3}$ .	Five sixths is written $\frac{5}{6}$ .
Three thirds is written $\frac{3}{3}$ .	One eighth is written $\frac{1}{8}$ .
Four thirds is written $\frac{4}{3}$ .	Two eighths is written $\frac{2}{8}$ .
One fourth is written $\frac{1}{4}$ .	Five eighths is written $\frac{5}{8}$ .
Three fourths is written $\frac{3}{4}$ .	Seven eighths is written $\frac{7}{8}$ .
Four fourths is written $\frac{4}{4}$ .	Eighth eighths is written $\frac{8}{8}$ .

### EXERCISE 5 (Written)

Express in figures:

1. Five halves; five thirds; five fourths; four sixths; six eighths.
2. Nine eighths; one seventh; one ninth; one tenth; one eleventh.
3. Three sevenths; six sevenths; two ninths; five ninths; seven ninths.
4. Three tenths; seven tenths; ten tenths; three elevenths; seven elevenths.
5. Four sevenths; seven elevenths; ten elevenths; one twelfth; five twelfths; seven twelfths.

**EXERCISE 6 (Oral)**

1. If one foot is divided into five equal parts, what is each of the parts called?
2. If one is divided into five equal parts, what is each part called?
3. If an orange is divided into six equal parts, what is each of the parts called?
4. If an orange is divided into seven equal parts, what is each of the parts called?
5. If a rectangle is divided into eight equal parts, what is each of the parts called?
6. If a tract of land is divided into ten equal parts, what is each of the parts called?
7. If a line is divided into twelve equal parts, what is each of the parts called? What are two of the parts called? What are five of the parts called?
  - a. If a line is divided into twenty equal parts, what is each of the parts called? What are three of the parts called? What are seven of the parts called?

If any one thing is divided into two, three, four, or any other number of equal parts, each of the equal parts of the thing so divided is called a **fractional unit**. One or more fractional units are called a **fraction**.

The numbers we have dealt with in Parts I and II of this book are called whole numbers, or integers. The numbers we shall now deal with are called **fractions**.

## EXERCISE 7 (Written)

1. $\frac{1}{3}$ of 48 = ?	16. $\frac{2}{3}$ of 48 = ?
2. $\frac{1}{4}$ of 56 = ?	17. $\frac{3}{4}$ of 44 = ?
3. $\frac{1}{6}$ of 96 = ?	18. $\frac{3}{5}$ of 60 = ?
4. $\frac{1}{7}$ of 84 = ?	19. $\frac{4}{5}$ of 55 = ?
5. $\frac{1}{8}$ of 96 = ?	20. $\frac{5}{6}$ of 36 = ?
6. $\frac{1}{5}$ of 125 = ?	21. $\frac{2}{7}$ of 35 = ?
7. $\frac{1}{7}$ of 196 = ?	22. $\frac{3}{7}$ of 49 = ?
8. $\frac{1}{9}$ of 243 = ?	23. $\frac{5}{7}$ of 63 = ?
9. $\frac{1}{10}$ of 400 = ?	24. $\frac{6}{7}$ of 77 = ?
10. $\frac{1}{11}$ of 2,002 = ?	25. $\frac{3}{8}$ of 48 = ?
11. $\frac{1}{12}$ of 144 = ?	26. $\frac{5}{8}$ of 72 = ?
12. $\frac{1}{12}$ of 1,728 = ?	27. $\frac{7}{8}$ of 64 = ?
13. $\frac{1}{9}$ of 486 = ?	28. $\frac{2}{9}$ of 36 = ?
14. $\frac{1}{8}$ of 512 = ?	29. $\frac{5}{9}$ of 81 = ?
15. $\frac{1}{7}$ of 1,463 = ?	30. $\frac{7}{9}$ of 90 = ?

## EXERCISE 8 (Oral)

1. How many  $\frac{1}{2}$ 's are in 1? How many  $\frac{1}{3}$ 's are in 1?
2. How many  $\frac{1}{4}$ 's are in 1? How many  $\frac{1}{5}$ 's are in 1?
3. How many  $\frac{1}{6}$ 's are in 1? How many  $\frac{1}{7}$ 's are in 1?
4. How many  $\frac{1}{8}$ 's are in 1? How many  $\frac{1}{9}$ 's are in 1?
5. How many  $\frac{1}{10}$ 's are in 1? How many  $\frac{1}{11}$ 's are in 1? How many  $\frac{1}{12}$ 's are in 1?

## EXERCISE 9 (Oral)

$\frac{1}{2}$	$\frac{1}{2}$
---------------	---------------

$\frac{1}{2}$	$\frac{1}{2}$
---------------	---------------

$\frac{1}{2}$	$\frac{1}{2}$
---------------	---------------

1. How many  $\frac{1}{2}$ 's are in 1? How many  $\frac{1}{2}$ 's are in 2? How many  $\frac{1}{2}$ 's are in 3? How many  $\frac{1}{2}$ 's are in 4? How many  $\frac{1}{2}$ 's are in 5? How many  $\frac{1}{2}$ 's are in 6? How many  $\frac{1}{2}$ 's are in 7?
2. How many  $\frac{1}{2}$ 's are in 10? How many  $\frac{1}{2}$ 's are in 12? How many  $\frac{1}{2}$ 's are in 20? How many  $\frac{1}{2}$ 's are in 15?
3. How many  $\frac{1}{2}$ 's are in  $1\frac{1}{2}$  (one and one half)?
4. How many  $\frac{1}{2}$ 's are in  $2\frac{1}{2}$  (two and one half)?
5. How many  $\frac{1}{2}$ 's are in  $3\frac{1}{2}$ ? How many  $\frac{1}{2}$ 's are in  $4\frac{1}{2}$ ?
6. How many  $\frac{1}{2}$ 's are in  $5\frac{1}{2}$ ? How many  $\frac{1}{2}$ 's are in  $6\frac{1}{2}$ ?
7. How many  $\frac{1}{2}$ 's are in  $7\frac{1}{2}$ ? How many  $\frac{1}{2}$ 's are in  $8\frac{1}{2}$ ?
8. How many  $\frac{1}{2}$ 's are in  $9\frac{1}{2}$ ? in  $10\frac{1}{2}$ ? in  $12\frac{1}{2}$ ?
9. How many  $\$ \frac{1}{2}$  are in  $\$ 2\frac{1}{2}$ ? How many  $\$ \frac{1}{2}$  are in  $\$ 5\frac{1}{2}$ ?
10. How many  $\$ \frac{1}{2}$  are in  $\$ 15\frac{1}{2}$ ?
11. How many  $\$ \frac{1}{2}$  are in  $\$ 20\frac{1}{2}$ ?

## EXERCISE 10 (Oral)

$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
---------------	---------------	---------------

$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
---------------	---------------	---------------

$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
---------------	---------------	---------------

1. How many  $\frac{1}{3}$ 's are in 1? How many  $\frac{1}{3}$ 's are in 2? How many  $\frac{1}{3}$ 's are in 3? How many  $\frac{1}{3}$ 's are in 4? How many  $\frac{1}{3}$ 's are in 5?
2. How many  $\frac{1}{3}$ 's are in 6? in 7? in 8? in 9? in 10? in 11? in 12?
3. How many  $\frac{1}{3}$ 's are in  $1\frac{1}{3}$  (one and one third)?
4. How many  $\frac{1}{3}$ 's are in  $1\frac{2}{3}$  (one and two thirds)?
5. How many  $\frac{1}{3}$ 's are in  $2\frac{1}{3}$  (two and one third)?
6. How many  $\frac{1}{3}$ 's are in  $2\frac{2}{3}$ ? in  $3\frac{1}{3}$ ? in  $3\frac{2}{3}$ ?
7. How many  $\frac{1}{3}$ 's are in  $4\frac{1}{3}$ ? in  $4\frac{2}{3}$ ? in  $5\frac{1}{3}$ ? in  $5\frac{2}{3}$ ?
8. How many  $\frac{1}{3}$ 's are in  $6\frac{2}{3}$ ? in  $7\frac{1}{3}$ ? in  $7\frac{2}{3}$ ?
9. How many  $\frac{1}{3}$ 's are in  $8\frac{1}{3}$ ? in  $8\frac{2}{3}$ ? in  $9\frac{1}{3}$ ? in  $9\frac{2}{3}$ ?
10. How many  $\frac{1}{3}$ 's are in  $10\frac{2}{3}$ ? in  $12\frac{1}{3}$ ? in  $15\frac{2}{3}$ ? in  $16\frac{2}{3}$ ?
11. How many  $\frac{1}{3}$ 's are in  $10\frac{1}{3}$ ? in  $11\frac{2}{3}$ ?
12. How many  $\frac{1}{3}$ 's are in  $13\frac{1}{3}$ ? in  $14\frac{2}{3}$ ?
13. How many  $\frac{1}{3}$ 's are in  $15\frac{1}{3}$ ? in  $11\frac{1}{3}$ ?
14. How many  $\frac{1}{3}$ 's are in  $20\frac{1}{3}$ ? in  $17\frac{1}{3}$ ?
15. How many  $\frac{1}{3}$ 's are in  $16\frac{1}{3}$ ? in  $30\frac{1}{3}$ ?

## EXERCISE 11 (Oral)

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
---------------	---------------	---------------	---------------

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
---------------	---------------	---------------	---------------

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
---------------	---------------	---------------	---------------

1. How many  $\frac{1}{4}$ 's are in 1? How many  $\frac{1}{4}$ 's are in 2? How many  $\frac{1}{4}$ 's are in 3? How many  $\frac{1}{4}$ 's are in 4? How many  $\frac{1}{4}$ 's are in 5? How many  $\frac{1}{4}$ 's are in 6? in 7? in 8? in 9? in 10?
2. How many  $\frac{1}{4}$ 's are in  $1\frac{1}{4}$  (one and one fourth)?
3. How many  $\frac{1}{4}$ 's are in  $2\frac{3}{4}$  (two and three fourths)?
4. How many  $\frac{1}{4}$ 's are in  $1\frac{3}{4}$ ? How many  $\frac{1}{4}$ 's are in  $2\frac{1}{4}$ ?
5. How many  $\frac{1}{4}$ 's are in  $3\frac{1}{4}$ ? How many  $\frac{1}{4}$ 's are in  $3\frac{3}{4}$ ?
6. How many  $\frac{1}{4}$ 's are in  $4\frac{1}{4}$ ? How many  $\frac{1}{4}$ 's are in  $4\frac{3}{4}$ ?
7. How many  $\frac{1}{4}$ 's are in  $5\frac{1}{4}$ ? How many  $\frac{1}{4}$ 's are in  $5\frac{3}{4}$ ?
8. How many  $\frac{1}{4}$ 's are in  $6\frac{1}{4}$ ? How many  $\frac{1}{4}$ 's are in  $6\frac{3}{4}$ ?
9. How many  $\frac{1}{4}$ 's are in  $7\frac{1}{4}$ ? How many  $\frac{1}{4}$ 's are in  $7\frac{3}{4}$ ?
10. How many  $\frac{1}{4}$ 's are in  $8\frac{1}{4}$ ? How many  $\frac{1}{4}$ 's are in  $8\frac{3}{4}$ ?

11. How many  $\frac{1}{4}$ 's are in  $9\frac{3}{4}$ ? in  $11\frac{1}{4}$ ? in  $12\frac{3}{4}$ ?
12. How many  $\frac{1}{4}$ 's are in  $9\frac{1}{4}$ ? in  $11\frac{3}{4}$ ? in  $12\frac{1}{4}$ ?
13. How many  $\frac{1}{4}$ 's are in  $15\frac{1}{4}$ ? in  $13\frac{3}{4}$ ? in  $14\frac{1}{4}$ ?
14. How many  $\frac{1}{4}$ 's are in  $20\frac{1}{4}$ ? in  $15\frac{3}{4}$ ? in  $14\frac{3}{4}$ ?
15. How many quarters are in \$1? How many quarters are in  $\$1\frac{1}{2}$ ?
16. How many quarters are in  $\$2\frac{1}{4}$ ? How many quarters are in  $\$2\frac{3}{4}$ ?
17. How many quarters are in \$10? in \$15? in  $\$5\frac{1}{4}$ ? in  $\$6\frac{3}{4}$ ?
18. How many quarters are in  $\$2\frac{1}{2}$ ? in  $\$11\frac{1}{4}$ ? in  $\$12\frac{1}{2}$ ?

Numbers such as  $1\frac{1}{2}$ ,  $2\frac{1}{3}$ ,  $3\frac{3}{4}$ , etc., are called **mixed numbers**.

A **mixed number** is a number part of which is a whole number and part of which is a fraction.

A fraction is expressed by two numbers, one of which is written above a horizontal line and the other below the same horizontal line.

The number written above the horizontal line is called the **numerator**.

The number written below the horizontal line is called the **denominator**.

Numerator means that which numbers. Denominator means that which names.

The numerator shows how many fractional units there are in the fraction. Thus, in the fraction  $\frac{2}{3}$ , 2 shows how many thirds there are.

The denominator names the fractional unit and tells how many fractional units are in one.

A fraction whose numerator is less than its denominator is called a **proper fraction**. Thus,  $\frac{1}{2}$ ,  $\frac{2}{3}$ ,  $\frac{5}{6}$ ,  $\frac{3}{8}$  are proper fractions.

A fraction whose numerator is equal to or greater than its denominator is called an **improper fraction**. Thus,  $\frac{5}{2}$ ,  $\frac{4}{3}$ ,  $\frac{4}{4}$ ,  $\frac{8}{3}$ ,  $\frac{7}{7}$ , etc., are improper fractions.

The numerator and the denominator are called the **terms of a fraction**.

Change  $2\frac{3}{4}$  to fourths.

In 1 there are 4 fourths.

In 2 there are 8 fourths.

8 fourths and 3 fourths are 11 fourths.

Therefore, in  $2\frac{3}{4}$  there are 11 fourths. *Ans.*  $\frac{11}{4}$ .

#### EXERCISE 12 (Oral)

Change to halves:

1.  $1\frac{1}{2}$ ;  $3\frac{1}{2}$ ;  $5\frac{1}{2}$ ;  $6\frac{1}{2}$ ;  $8\frac{1}{2}$ ; 9; 11; 13; 15.

Change to thirds:

2.  $1\frac{1}{3}$ ;  $2\frac{2}{3}$ ;  $3\frac{1}{3}$ ;  $5\frac{1}{3}$ ;  $6\frac{2}{3}$ ; 7; 9; 10; 15;  $14\frac{1}{3}$ ;  $16\frac{2}{3}$ .

Change to fourths:

3.  $1\frac{3}{4}$ ;  $2\frac{1}{4}$ ;  $3\frac{3}{4}$ ;  $4\frac{1}{4}$ ;  $5\frac{3}{4}$ ;  $7\frac{1}{4}$ ; 9; 6; 10; 12;  $13\frac{1}{4}$ .

Change to fifths:

4.  $1\frac{2}{5}$ ;  $1\frac{4}{5}$ ;  $2\frac{1}{5}$ ;  $2\frac{4}{5}$ ;  $3\frac{3}{5}$ ; 4; 11; 13;  $5\frac{2}{5}$ ;  $6\frac{3}{5}$ ;  $7\frac{4}{5}$ .

Change to sixths:

5.  $1\frac{5}{6}$ ;  $2\frac{1}{6}$ ;  $2\frac{5}{6}$ ;  $3\frac{5}{6}$ ;  $4\frac{1}{6}$ ;  $7\frac{5}{6}$ ; 4; 8; 12;  $11\frac{1}{6}$ .

Change to sevenths:

6.  $1\frac{3}{7}$ ;  $1\frac{6}{7}$ ;  $2\frac{2}{7}$ ;  $2\frac{6}{7}$ ;  $3\frac{4}{7}$ ;  $4\frac{2}{7}$ ;  $5\frac{5}{7}$ ; 2; 5; 7; 9;  
 $10\frac{3}{7}$ .

Change to eighths:

7.  $1\frac{3}{8}$ ;  $1\frac{7}{8}$ ;  $2\frac{5}{8}$ ;  $2\frac{7}{8}$ ;  $3\frac{1}{8}$ ;  $3\frac{5}{8}$ ;  $4\frac{7}{8}$ ;  $7\frac{7}{8}$ ; 6; 9; 12.

Change to ninths:

8.  $1\frac{1}{9}$ ;  $2\frac{2}{9}$ ;  $3\frac{4}{9}$ ;  $5\frac{5}{9}$ ;  $6\frac{7}{9}$ ;  $9\frac{8}{9}$ ; 10; 7; 12; 8;  $11\frac{1}{9}$ .

Change to tenths:

9.  $1\frac{1}{10}$ ;  $2\frac{5}{10}$ ;  $3\frac{7}{10}$ ;  $4\frac{9}{10}$ ;  $8\frac{7}{10}$ ;  $9\frac{3}{10}$ ; 7; 10; 13;  
20.

Change to twelfths:

10.  $1\frac{1}{12}$ ;  $1\frac{11}{12}$ ;  $2\frac{5}{12}$ ;  $3\frac{7}{12}$ ;  $4\frac{5}{12}$ ;  $5\frac{11}{12}$ ;  $6\frac{1}{12}$ ; 5.

11. Change  $4\frac{3}{4}$  to fourths;  $2\frac{3}{5}$  to fifths;  $2\frac{5}{7}$  to sevenths;  $2\frac{1}{8}$  to eighths;  $9\frac{5}{9}$  to ninths;  $8\frac{9}{10}$  to tenths.

12. Change  $7\frac{1}{2}$  to halves;  $5\frac{2}{3}$  to thirds;  $6\frac{1}{4}$  to fourths;  $5\frac{4}{5}$  to fifths;  $5\frac{5}{6}$  to sixths;  $7\frac{6}{7}$  to sevenths.

13. Change  $9\frac{7}{8}$  to eighths;  $9\frac{7}{9}$  to ninths;  $10\frac{7}{10}$  to tenths;  $4\frac{7}{12}$  to twelfths;  $3\frac{2}{9}$  to ninths;  $4\frac{1}{10}$  to tenths.

Change  $1\frac{7}{5}$  to a mixed number.

$$5 \text{ fifths} = 1.$$

$$17 \text{ fifths} = 3 \text{ and } 2 \text{ fifths.}$$

Therefore,  $1\frac{7}{5} = 3\frac{2}{5}$ .

### EXERCISE 18 (Oral and Written)

Change to mixed numbers:

1.  $\frac{3}{2}$ ;  $\frac{5}{2}$ ;  $\frac{9}{2}$ ;  $1\frac{3}{2}$ ;  $1\frac{7}{2}$ ;  $2\frac{1}{2}$ ;  $1\frac{9}{2}$ ;  $2\frac{3}{2}$ ;  $1\frac{5}{2}$ ;  $2\frac{5}{2}$ ;  $3\frac{1}{2}$ .

2.  $\frac{4}{3}$ ;  $\frac{5}{3}$ ;  $\frac{7}{3}$ ;  $1\frac{10}{3}$ ;  $1\frac{14}{3}$ ;  $1\frac{7}{3}$ ;  $1\frac{9}{3}$ ;  $2\frac{3}{3}$ ;  $2\frac{5}{3}$ ;  $1\frac{3}{3}$ ;  $1\frac{6}{3}$ .

3.  $\frac{5}{4}; \frac{7}{4}; \frac{10}{4}; \frac{13}{4}; \frac{15}{4}; \frac{19}{4}; \frac{21}{4}; \frac{23}{4}; \frac{25}{4}; \frac{27}{4}; \frac{31}{4}.$
4.  $\frac{6}{5}; \frac{9}{5}; \frac{11}{5}; \frac{14}{5}; \frac{16}{5}; \frac{19}{5}; \frac{21}{5}; \frac{24}{5}; \frac{29}{5}; \frac{32}{5}; \frac{38}{5}.$
5.  $\frac{10}{6}; \frac{13}{6}; \frac{17}{6}; \frac{19}{6}; \frac{23}{6}; \frac{29}{6}; \frac{35}{6}; \frac{37}{6}; \frac{41}{6}; \frac{47}{6}.$
6.  $\frac{8}{7}; \frac{13}{7}; \frac{15}{7}; \frac{18}{7}; \frac{22}{7}; \frac{27}{7}; \frac{31}{7}; \frac{33}{7}; \frac{36}{7}; \frac{41}{7}; \frac{45}{7}.$
7.  $\frac{11}{8}; \frac{15}{8}; \frac{19}{8}; \frac{21}{8}; \frac{25}{8}; \frac{31}{8}; \frac{35}{8}; \frac{43}{8}; \frac{47}{8}; \frac{51}{8}.$
8.  $\frac{13}{9}; \frac{17}{9}; \frac{19}{9}; \frac{22}{9}; \frac{28}{9}; \frac{35}{9}; \frac{41}{9}; \frac{47}{9}; \frac{51}{9}; \frac{59}{9}.$
9.  $\frac{13}{10}; \frac{17}{10}; \frac{21}{10}; \frac{29}{10}; \frac{31}{10}; \frac{39}{10}; \frac{47}{10}; \frac{53}{10}; \frac{63}{10}; \frac{69}{10}.$
10.  $\frac{13}{11}; \frac{17}{11}; \frac{21}{11}; \frac{25}{11}; \frac{31}{11}; \frac{39}{11}; \frac{43}{11}; \frac{54}{11}; \frac{62}{11}; \frac{72}{11}.$
11.  $\frac{13}{12}; \frac{19}{12}; \frac{23}{12}; \frac{29}{12}; \frac{31}{12}; \frac{35}{12}; \frac{41}{12}; \frac{47}{12}; \frac{59}{12}; \frac{65}{12}.$
12.  $\frac{7}{2}; \frac{11}{3}; \frac{34}{3}; \frac{11}{4}; \frac{33}{4}; \frac{7}{5}; \frac{13}{5}; \frac{25}{6}; \frac{32}{6}; \frac{8}{7}; \frac{19}{7}.$
13.  $\frac{40}{7}; \frac{32}{7}; \frac{17}{8}; \frac{27}{8}; \frac{23}{9}; \frac{29}{9}; \frac{37}{10}; \frac{51}{10}; \frac{41}{11}; \frac{61}{12}.$

Add :

$$\frac{11}{4}$$

$2\frac{3}{4}$  1 fourth + 3 fourths + 1 fourth + 3 fourths

$3\frac{1}{4}$  + 1 fourth = 9 fourths =  $\frac{9}{4} = 2\frac{1}{4}$ . Write  $\frac{1}{4}$

$3\frac{3}{4}$  and carry 2.  $2 + 4 + 3 + 3 + 2 + 1 = 15$ .

$4\frac{1}{4}$  The answer is  $15\frac{1}{4}$ .

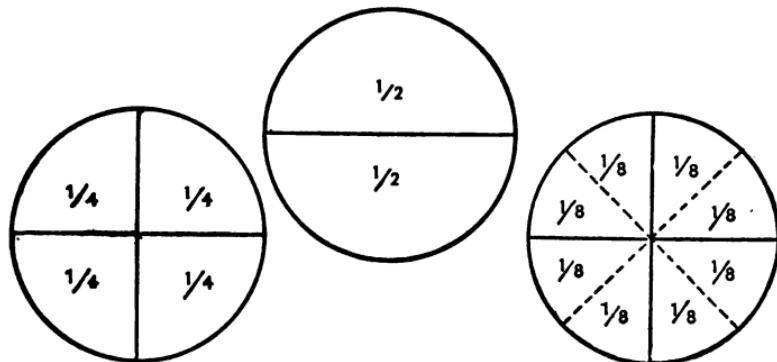
$$\frac{151}{4}$$

#### EXERCISE 14 (Written)

1.  $1\frac{1}{2} + 2\frac{1}{2} + 3\frac{1}{2} + 5\frac{1}{2} = ?$
2.  $1\frac{1}{3} + 1\frac{2}{3} + 2\frac{2}{3} + 3\frac{1}{3} = ?$
3.  $4\frac{1}{4} + 3\frac{1}{4} + 2\frac{1}{4} + 5\frac{3}{4} = ?$
4.  $1\frac{1}{5} + 1\frac{3}{5} + 1\frac{4}{5} + 2\frac{1}{5} = ?$
5.  $\frac{3}{5} + \frac{4}{5} + 1\frac{1}{5} + 3\frac{2}{5} = ?$
6.  $1\frac{1}{6} + \frac{5}{6} + 2\frac{5}{6} + 4\frac{1}{6} = ?$
7.  $\frac{5}{6} + 4\frac{5}{6} + 6\frac{1}{6} + 2\frac{5}{6} = ?$
8.  $\frac{3}{7} + \frac{5}{7} + \frac{6}{7} + 1\frac{1}{7} = ?$
9.  $\frac{8}{8} + 1\frac{7}{8} + 2\frac{1}{8} + 2\frac{5}{8} = ?$
10.  $\frac{7}{8} + 1\frac{3}{8} + 2\frac{5}{8} + 6\frac{7}{8} = ?$
11.  $2\frac{1}{9} + 5\frac{4}{9} + 3\frac{7}{9} + 4\frac{8}{9} = ?$
12.  $\frac{8}{9} + \frac{7}{9} + \frac{5}{9} + 5\frac{5}{9} = ?$

13.  $1\frac{1}{10} + 1\frac{3}{10} + \frac{9}{10} + \frac{7}{10} = ?$
14.  $\frac{3}{10} + \frac{8}{10} + 2\frac{1}{10} + 4\frac{3}{10} = ?$
15.  $2\frac{9}{10} + \frac{6}{10} + \frac{7}{10} + \frac{3}{10} = ?$
16.  $\frac{7}{11} + \frac{10}{11} + \frac{5}{11} + \frac{6}{11} = ?$
17.  $1\frac{1}{11} + \frac{9}{11} + \frac{8}{11} + 4\frac{7}{11} = ?$
18.  $5\frac{3}{11} + \frac{2}{11} + 2\frac{4}{11} = ?$
19.  $\frac{5}{12} + \frac{11}{12} + 1\frac{1}{12} + 4\frac{11}{12} = ?$
20.  $\frac{1}{12} + \frac{5}{12} + \frac{7}{12} + \frac{11}{12} = ?$
21.  $3\frac{7}{12} + \frac{1}{12} + 5\frac{5}{12} + \frac{11}{12} = ?$

**EXERCISE 15 (Oral and Written)**



1.  $\frac{1}{2}$  is equal to how many  $\frac{1}{4}$ 's?
2.  $\frac{1}{2}$  is equal to how many  $\frac{1}{8}$ 's?
3.  $\frac{1}{4}$  is equal to how many  $\frac{1}{8}$ 's?
4. What is the sum of  $\frac{1}{2}$  and  $\frac{1}{4}$ ?

$$\frac{1}{2} = \frac{2}{4}$$

$$\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

$$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

Therefore,

5. What is the sum of  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ ?

$$\frac{1}{2} = \frac{4}{8}$$

$$\frac{1}{4} = \frac{2}{8}$$

$$\frac{1}{8} = \frac{1}{8}$$

Therefore,  $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{4}{8} + \frac{2}{8} + \frac{1}{8} = \frac{7}{8}$ .

6. What is the sum of  $\frac{1}{2}$  and  $\frac{3}{4}$ ? of  $\frac{1}{2}$  and  $\frac{3}{8}$ ? of  $\frac{1}{2}$  and  $\frac{5}{8}$ ?

7. What is the sum of  $\frac{1}{2}$  and  $\frac{7}{8}$ ? of  $\frac{1}{2}$  and  $\frac{1}{8}$ ? of  $\frac{1}{4}$  and  $\frac{1}{8}$ ?

8. What is the sum of  $\frac{3}{4}$  and  $\frac{1}{8}$ ? of  $\frac{3}{4}$  and  $\frac{3}{8}$ ? of  $\frac{3}{4}$  and  $\frac{5}{8}$ ?

9. What is the sum of  $\frac{3}{4}$  and  $\frac{7}{8}$ ? of  $\frac{1}{4}$  and  $\frac{3}{8}$ ? of  $\frac{1}{4}$  and  $\frac{5}{8}$ ?

10. What is the sum of  $\frac{1}{4}$  and  $\frac{7}{8}$ ? of  $\frac{1}{2}$  and  $\frac{4}{8}$ ?

11. What is the sum of  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and  $\frac{1}{8}$ ?

12. What is the sum of  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{3}{8}$ ?

13. What is the sum of  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{5}{8}$ ?

14. What is the sum of  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and  $\frac{7}{8}$ ?

15.  $\frac{1}{2} + \frac{1}{4} + 1\frac{3}{8} = ?$       24.  $2\frac{3}{8} + 3\frac{3}{8} + 3\frac{3}{4} = ?$

16.  $\frac{1}{2} + \frac{3}{4} + \frac{5}{8} = ?$       25.  $2\frac{1}{8} + 1\frac{1}{2} + 1\frac{3}{4} = ?$

17.  $\frac{1}{2} + \frac{3}{4} + \frac{3}{8} = ?$       26.  $2\frac{5}{8} + 1\frac{1}{4} + 4\frac{1}{2} = ?$

18.  $2\frac{1}{2} + 3\frac{3}{4} + \frac{1}{8} = ?$       27.  $1\frac{5}{8} + 5\frac{1}{4} + 3\frac{1}{2} = ?$

19.  $2\frac{1}{2} + 3\frac{1}{4} + 1\frac{1}{2} = ?$       28.  $5\frac{3}{8} + 2\frac{1}{2} + 2\frac{3}{4} = ?$

20.  $3\frac{1}{4} + 3\frac{1}{2} + 2\frac{3}{4} = ?$       29.  $2\frac{1}{4} + 3\frac{7}{8} + 2\frac{1}{2} = ?$

21.  $5\frac{1}{2} + 4\frac{3}{4} + 2\frac{3}{4} = ?$       30.  $1\frac{1}{8} + 5\frac{3}{4} + 6\frac{1}{2} = ?$

22.  $6\frac{1}{4} + 4\frac{1}{2} + 1\frac{3}{4} = ?$       31.  $4\frac{7}{8} + 3\frac{1}{4} + 1\frac{1}{2} = ?$

23.  $1\frac{7}{8} + 1\frac{3}{4} + 1\frac{1}{8} = ?$       32.  $1\frac{3}{8} + 7\frac{3}{4} + 2\frac{7}{8} = ?$

## EXERCISE 16 (Oral)

$\frac{1}{2}$	$\frac{1}{2}$
---------------	---------------

$\frac{1}{3}$
$\frac{1}{3}$
$\frac{1}{3}$

$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
---------------	---------------	---------------	---------------

$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$
$\frac{1}{12}$			
$\frac{1}{12}$			

1.  $\frac{1}{2}$  is equal to how many  $\frac{1}{12}$ 's?
2.  $\frac{1}{3}$  is equal to how many  $\frac{1}{12}$ 's?
3.  $\frac{1}{4}$  is equal to how many  $\frac{1}{12}$ 's?
4.  $\frac{3}{4}$  is equal to how many  $\frac{1}{12}$ 's?
5.  $\frac{3}{4}$  is equal to how many  $\frac{1}{12}$ 's?
6.  $\frac{2}{3}$  is equal to how many  $\frac{1}{12}$ 's?
7.  $\frac{2}{3}$  is equal to how many  $\frac{1}{12}$ 's?
8. Show from the above illustrations that  

$$\frac{1}{2} = \frac{2}{4} = \frac{6}{12}.$$
9. Show from the above illustrations that  

$$\frac{1}{3} = \frac{2}{6} = \frac{4}{12}.$$
10. Show from the above illustrations that  

$$\frac{2}{3} = \frac{4}{6} = \frac{8}{12}.$$
11. Show from the above illustrations that  

$$\frac{1}{4} = \frac{3}{12}.$$
12. Show from the above illustrations that  

$$\frac{3}{4} = \frac{9}{12}.$$

13. Take the fraction  $\frac{1}{2}$ . Multiply its terms by 2. How does  $\frac{1}{2}$  compare with  $\frac{2}{4}$ ? Multiply its terms by 3. How does  $\frac{1}{2}$  compare with  $\frac{3}{6}$ ? Multiply its terms by 4. How does  $\frac{1}{2}$  compare with  $\frac{4}{8}$ ?

14. What is  $\frac{1}{10}$  of \$1? What is  $\frac{5}{10}$  of \$1?

If you multiply the terms of the fraction  $\frac{1}{2}$  by 5, what fraction do you get? How does  $\frac{1}{2}$  compare with  $\frac{5}{10}$ ?

15. Take the fraction  $\frac{2}{3}$ . Multiply its terms by 2. What fraction do you get? How does  $\frac{2}{3}$  compare with  $\frac{4}{6}$ ?

16. Multiply the terms of the fraction  $\frac{2}{3}$  by 4. What fraction do you get? How does  $\frac{2}{3}$  compare with  $\frac{8}{12}$ ?

17. Take the fraction  $\frac{3}{4}$ . Multiply its terms by 2. What fraction do you get? How does  $\frac{3}{4}$  compare with  $\frac{6}{8}$ ?

18. Multiply the terms of the fraction  $\frac{3}{4}$  by 3. What fraction do you get? How does  $\frac{3}{4}$  compare with  $\frac{9}{12}$ ?

If the terms of a fraction be multiplied by the same number, the value of the fraction remains unchanged.

We have seen that  $\frac{2}{3} = \frac{4}{6} = \frac{8}{12}$ .

Therefore,  $\frac{8}{12} = \frac{2}{3}$ .

Therefore,  $\frac{4}{6} = \frac{2}{3}$ .

Therefore, if we divide the terms of the fraction,  $\frac{8}{12}$ , by 4, the value of the fraction remains unchanged;

and if we divide the terms of the fraction,  $\frac{4}{6}$ , by 2, the value of this fraction remains unchanged. Hence, if the terms of a fraction be divided by the same number, the value of the fraction remains unchanged.

**EXERCISE 17 (Written)**

Copy and complete :

1. $\frac{1}{2} = \frac{6}{\text{ }}.$	6. $\frac{1}{5} = \frac{10}{\text{ }}.$	11. $\frac{1}{6} = \frac{12}{\text{ }}.$	16. $\frac{2}{3} = \frac{18}{\text{ }}.$
2. $\frac{1}{3} = \frac{12}{\text{ }}.$	7. $\frac{3}{5} = \frac{20}{\text{ }}.$	12. $\frac{5}{6} = \frac{18}{\text{ }}.$	17. $\frac{3}{5} = \frac{25}{\text{ }}.$
3. $\frac{2}{3} = \frac{9}{\text{ }}.$	8. $\frac{2}{5} = \frac{15}{\text{ }}.$	13. $\frac{2}{3} = \frac{18}{\text{ }}.$	18. $\frac{4}{5} = \frac{10}{\text{ }}.$
4. $\frac{1}{4} = \frac{12}{\text{ }}.$	9. $\frac{3}{4} = \frac{20}{\text{ }}.$	14. $\frac{3}{4} = \frac{16}{\text{ }}.$	19. $\frac{3}{4} = \frac{24}{\text{ }}.$
5. $\frac{3}{4} = \frac{20}{\text{ }}.$	10. $\frac{2}{3} = \frac{15}{\text{ }}.$	15. $\frac{1}{2} = \frac{20}{\text{ }}.$	20. $\frac{3}{8} = \frac{24}{\text{ }}.$

A fraction is in its simplest form when its terms have no common factor.

Reduce  $\frac{12}{20}$  to its simplest form.

4 is a common factor of numerator and denominator. Dividing the terms of this fraction by 4, we have

$$\frac{12}{20} = \frac{3}{5}.$$

**EXERCISE 18 (Written)**

Reduce each of the following fractions to its simplest form :

1. $\frac{9}{12}.$	5. $\frac{5}{15}.$	9. $\frac{15}{20}.$	13. $\frac{14}{16}.$	17. $\frac{21}{24}.$
2. $\frac{6}{12}.$	6. $\frac{10}{20}.$	10. $\frac{8}{20}.$	14. $\frac{16}{24}.$	18. $\frac{18}{24}.$
3. $\frac{8}{12}.$	7. $\frac{12}{16}.$	11. $\frac{16}{20}.$	15. $\frac{15}{25}.$	19. $\frac{9}{24}.$
4. $\frac{6}{9}.$	8. $\frac{12}{18}.$	12. $\frac{8}{18}.$	16. $\frac{20}{25}.$	20. $\frac{10}{25}.$

## EXERCISE 19

To work the following examples, children should be provided with rulers graduated to eighths or sixteenths of an inch.

1. Draw a line one inch long. Two inches long. Five inches long. Six inches long.
2. Draw a line  $1\frac{1}{2}$  in. long.  $2\frac{1}{2}$  in. long.  $3\frac{1}{2}$  in. long.  $4\frac{1}{2}$  in. long.  $5\frac{1}{2}$  in. long.
3. Draw a line  $\frac{3}{4}$  in. long.  $1\frac{3}{4}$  in. long.  $2\frac{3}{4}$  in. long.  $3\frac{3}{4}$  in. long.  $4\frac{3}{4}$  in. long.  $5\frac{3}{4}$  in. long.
4. Draw a line  $\frac{1}{4}$  in. long.  $1\frac{1}{4}$  in. long.  $4\frac{1}{4}$  in. long.  $3\frac{1}{4}$  in. long.  $2\frac{1}{4}$  in. long.  $5\frac{1}{4}$  in. long.
5. Draw a line  $\frac{1}{8}$  in. long.  $\frac{3}{8}$  in. long.  $\frac{5}{8}$  in. long.  $\frac{7}{8}$  in. long.  $\frac{9}{8}$  in. long.
6. Which is the greater,  $\frac{1}{2}$  or  $\frac{3}{8}$ ?  $\frac{5}{8}$  or  $\frac{1}{2}$ ?  $\frac{7}{8}$  or  $\frac{3}{4}$ ?
7. Draw a line  $1\frac{3}{8}$  in. long.  $2\frac{1}{8}$  in. long.  $3\frac{5}{8}$  in. long.
8. Draw a line  $2\frac{3}{8}$  in. long.  $1\frac{7}{8}$  in. long.  $3\frac{1}{8}$  in. long.
9. Count by halves to six.
10. Count by fourths to four.
11. Count by eighths to three.
12. Draw a line  $\frac{11}{16}$  of an inch.  $\frac{3}{4}$  of an inch.
13. Which is greater,  $\frac{3}{4}$  or  $\frac{11}{16}$ ?
14. Draw a line  $\frac{7}{8}$  of an inch.  $\frac{13}{16}$  of an inch.
15. Which is greater,  $\frac{7}{8}$  or  $\frac{13}{16}$ ?

## ADDITION

Add  $\frac{1}{2}$  and  $\frac{2}{3}$ .

To add fractions they must be of the same denomination, or, if not, they must be reduced to the same denomination.

$\frac{1}{2}$  can be reduced to sixths and  $\frac{2}{3}$  can be reduced to sixths.

$$\frac{1}{2} = \frac{3}{6};$$

$$\frac{2}{3} = \frac{4}{6}.$$

Therefore,  $\frac{1}{2} + \frac{2}{3} = \frac{3}{6} + \frac{4}{6} = \frac{7}{6}$ .

$\frac{7}{6}$  being an improper fraction, we reduce it to a mixed number, namely,  $1\frac{1}{6}$ .

## EXERCISE 20 (Written)

1.  $\frac{1}{2} + \frac{1}{3} = ?$

5.  $\frac{1}{3} + \frac{5}{6} = ?$

9.  $\frac{3}{4} + \frac{1}{6} = ?$

2.  $\frac{2}{3} + \frac{1}{4} = ?$

6.  $\frac{1}{2} + \frac{1}{6} = ?$

10.  $\frac{1}{4} + \frac{5}{6} = ?$

3.  $\frac{1}{3} + \frac{3}{4} = ?$

7.  $\frac{1}{2} + \frac{5}{6} = ?$

11.  $\frac{3}{4} + \frac{5}{6} = ?$

4.  $\frac{2}{3} + \frac{1}{6} = ?$

8.  $\frac{1}{4} + \frac{1}{6} = ?$

12.  $\frac{1}{2} + \frac{1}{12} = ?$

Add  $\frac{1}{3}$ ,  $\frac{3}{4}$ , and  $\frac{1}{6}$ .

Thirds, fourths, and sixths can each be reduced to twelfths.

$$\frac{1}{3} = \frac{4}{12}.$$

$$\frac{3}{4} = \frac{9}{12}.$$

$$\frac{1}{6} = \frac{2}{12}.$$

Therefore,  $\frac{1}{3} + \frac{3}{4} + \frac{1}{6} = \frac{4}{12} + \frac{9}{12} + \frac{2}{12} = \frac{15}{12}$ .

$$\frac{15}{12} = 1\frac{3}{12} = 1\frac{1}{4}.$$

## EXERCISE 21 (Written)

1.  $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = ?$

9.  $\frac{1}{2} + \frac{1}{5} + \frac{1}{10} = ?$

2.  $\frac{1}{2} + \frac{2}{3} + \frac{1}{4} = ?$

10.  $\frac{1}{2} + \frac{2}{5} + \frac{3}{10} = ?$

3.  $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} = ?$

11.  $\frac{2}{5} + \frac{7}{10} + \frac{1}{2} = ?$

4.  $\frac{1}{3} + \frac{1}{4} + \frac{1}{6} = ?$

12.  $\frac{3}{5} + \frac{3}{10} + \frac{1}{2} = ?$

5.  $\frac{2}{3} + \frac{1}{2} + \frac{1}{6} = ?$

13.  $\frac{3}{5} + \frac{9}{10} + \frac{1}{2} = ?$

6.  $\frac{2}{3} + \frac{3}{4} + \frac{5}{6} = ?$

14.  $\frac{1}{3} + \frac{1}{5} + \frac{2}{15} = ?$

7.  $\frac{1}{3} + \frac{3}{4} + \frac{1}{6} = ?$

15.  $\frac{2}{5} + \frac{2}{5} + \frac{2}{15} = ?$

8.  $\frac{1}{2} + \frac{5}{6} + \frac{1}{3} = ?$

16.  $\frac{3}{5} + \frac{1}{3} + \frac{11}{15} = ?$

Add  $1\frac{1}{4}$ ,  $2\frac{5}{6}$ , and  $1\frac{7}{12}$ .

Add the fractions and the whole numbers separately, then add their sums.

Fourths, sixths, and twelfths can be reduced to twelfths.

$$\frac{1}{4} = \frac{3}{12}.$$

$$\frac{5}{6} = \frac{10}{12}.$$

$$\frac{7}{12} = \frac{7}{12}.$$

Therefore,  $\frac{1}{4} + \frac{5}{6} + \frac{7}{12} = \frac{3}{12} + \frac{10}{12} + \frac{7}{12} = \frac{20}{12}.$

$$\frac{20}{12} = 1\frac{8}{12} = 1\frac{2}{3}.$$

Next, add the whole numbers, namely, 1, 2, and 1.

$$1 + 2 + 1 = 4.$$

Adding the sums, we get

$$4 + 1\frac{2}{3} = 5\frac{2}{3}, \text{ Ans.}$$

## EXERCISE 23 (Written)

1. $1\frac{1}{2} + 2\frac{1}{4} + 2\frac{2}{3} = ?$	8. $5\frac{1}{2} + 5\frac{5}{12} + 2\frac{1}{6} = ?$
2. $1\frac{1}{3} + 3\frac{3}{4} + 2\frac{2}{5} = ?$	9. $7\frac{1}{2} + 5\frac{1}{2} + 3\frac{1}{12} = ?$
3. $2\frac{1}{3} + 3\frac{1}{6} + 4\frac{1}{2} = ?$	10. $4\frac{5}{12} + 5\frac{5}{6} + 2\frac{1}{2} = ?$
4. $4\frac{1}{4} + 4\frac{1}{3} + 2\frac{5}{6} = ?$	11. $3\frac{3}{5} + 2\frac{1}{2} + 1\frac{3}{10} = ?$
5. $3\frac{2}{3} + 3\frac{5}{6} + 1\frac{1}{2} = ?$	12. $2\frac{2}{5} + 6\frac{1}{2} + 2\frac{7}{10} = ?$
6. $4\frac{1}{6} + 5\frac{3}{4} + 4\frac{2}{3} = ?$	13. $4\frac{1}{5} + 3\frac{1}{2} + 3\frac{9}{10} = ?$
7. $5\frac{1}{4} + 2\frac{1}{3} + 3\frac{1}{6} = ?$	14. $3\frac{1}{2} + 4\frac{1}{5} + 4\frac{9}{10} = ?$

## EXERCISE 23 (Written)

1. A boy studies  $1\frac{1}{2}$  hours in the morning,  $1\frac{2}{3}$  hours during school, and  $\frac{3}{4}$  of an hour in the afternoon. How many hours does he study during the day?
2. Henry White plays  $\frac{3}{4}$  of an hour in the morning and  $2\frac{2}{3}$  hours in the afternoon. How many hours does he play?
3. William Coan walks  $2\frac{1}{2}$  miles in the morning and  $3\frac{2}{3}$  miles in the afternoon. How many miles does he walk during the day?
4. Mary Harper has  $\$1\frac{7}{10}$  and her mother gives her  $\$1\frac{1}{2}$ . How much money has she?
5. A man sold  $\frac{1}{3}$ ,  $\frac{1}{4}$ , and  $\frac{1}{6}$  of his farm to his neighbors. What part of his farm did he sell?
6. A housekeeper buys  $1\frac{1}{2}$  dozen eggs on Monday,  $2\frac{1}{2}$  dozen on Tuesday, and  $3\frac{1}{2}$  dozen on Wednesday. How many eggs does she buy in the three days?

7. A housekeeper buys  $2\frac{1}{4}$  pounds of meat for breakfast,  $3\frac{3}{4}$  pounds for dinner, and  $2\frac{1}{2}$  pounds for supper. How many pounds of meat does she buy in a day?

8. A poultry dealer bought three turkeys; one weighed  $10\frac{3}{4}$  pounds, another  $11\frac{1}{2}$  pounds, and the third  $12\frac{2}{3}$  pounds. How much did the three turkeys weigh?

9. How many hours are  $\frac{1}{2}$  of an hour,  $\frac{3}{4}$  of an hour, and  $1\frac{1}{3}$  hours?

10. How many feet are  $1\frac{1}{2}$  feet,  $2\frac{1}{3}$  feet, and  $2\frac{3}{4}$  feet?

11. How many dollars are  $\$1\frac{2}{5}$ ,  $\$2\frac{1}{2}$ , and  $\$2\frac{4}{5}$ ?

12. How many inches are  $1\frac{3}{4}$  inches,  $3\frac{1}{2}$  inches, and  $2\frac{5}{8}$  inches?

13. How many yards are  $3\frac{1}{6}$  yards,  $1\frac{1}{3}$  yards, and  $3\frac{1}{2}$  yards?

### SUBTRACTION

From  $\frac{7}{8}$  take  $\frac{1}{2}$ .

Reduce the fractions to the same denomination.

$\frac{1}{2}$  can be reduced to eighths.

$$\frac{7}{8} = \frac{7}{8}$$

$$\frac{1}{2} = \frac{4}{8}$$

Therefore,  $\frac{7}{8} - \frac{1}{2} = \frac{7}{8} - \frac{4}{8} = \frac{3}{8}$ .

From  $\frac{3}{4}$  take  $\frac{2}{3}$ .

Fourths and thirds can each be reduced to twelfths.

$$\frac{3}{4} = \frac{9}{12}$$

$$\frac{2}{3} = \frac{8}{12}$$

Therefore,  $\frac{3}{4} - \frac{2}{3} = \frac{9}{12} - \frac{8}{12} = \frac{1}{12}$ .

## EXERCISE 24 (Written)

1.  $\frac{1}{2} - \frac{1}{3} = ?$

2.  $\frac{2}{3} - \frac{1}{2} = ?$

3.  $\frac{7}{8} - \frac{1}{4} = ?$

4.  $\frac{5}{8} - \frac{1}{2} = ?$

5.  $\frac{5}{6} - \frac{1}{2} = ?$

6.  $\frac{5}{6} - \frac{2}{3} = ?$

7.  $\frac{5}{6} - \frac{1}{4} = ?$

8.  $\frac{5}{6} - \frac{3}{4} = ?$

9.  $\frac{7}{12} - \frac{1}{2} = ?$

10.  $\frac{11}{12} - \frac{1}{2} = ?$

11.  $\frac{11}{12} - \frac{3}{4} = ?$

12.  $\frac{11}{12} - \frac{5}{6} = ?$

13.  $\frac{7}{8} - \frac{3}{4} = ?$

14.  $\frac{7}{10} - \frac{1}{2} = ?$

15.  $\frac{9}{10} - \frac{1}{2} = ?$

16.  $\frac{1}{6} - \frac{1}{12} = ?$

17.  $\frac{1}{4} - \frac{1}{6} = ?$

18.  $\frac{1}{3} - \frac{1}{4} = ?$

From  $1\frac{1}{2}$  take  $\frac{3}{4}$ .

$1\frac{1}{2}$       The fraction  $\frac{3}{4}$  cannot be taken from  $\frac{1}{2}$ .

$\frac{3}{4}$       Therefore, reduce  $1\frac{1}{2}$  to fourths.    $1\frac{1}{2} = \frac{3}{2}$

$$\frac{3}{4} = \frac{6}{4}. \quad \frac{6}{4} - \frac{3}{4} = \frac{3}{4}.$$

From  $4\frac{1}{2}$  take  $1\frac{2}{3}$ .

$4\frac{1}{2}$       The fraction  $\frac{2}{3}$  being greater than  $\frac{1}{2}$ ,

$1\frac{2}{3}$       take  $\frac{2}{3}$  from  $1\frac{1}{2}$ .

$\frac{2}{6}$        $1\frac{1}{2} = \frac{3}{2} = \frac{9}{6}$ ;  $\frac{2}{3} = \frac{4}{6}$ .    $\frac{9}{6} - \frac{4}{6} = \frac{5}{6}$ .   Carry 1;

1 and 1 are 2.   2 and 2 are 4.   The remainder is  $2\frac{5}{6}$ .

How many inches are in  $1\frac{1}{2}$  feet?

How many inches are in  $\frac{3}{4}$  of a foot?

How many inches are in the difference between  $1\frac{1}{2}$  feet and  $\frac{3}{4}$  of a foot?

What fraction of a foot is this difference?

How many inches are in  $4\frac{1}{2}$  feet?

How many inches are in  $1\frac{2}{3}$  feet?

How many inches are in the difference between  $4\frac{1}{2}$  feet and  $1\frac{2}{3}$  feet?

What fraction of a foot is this difference?

## EXERCISE 25 (Written)

1. $2\frac{1}{4} - \frac{1}{2} = ?$	9. $3\frac{2}{3} - 1\frac{3}{4} = ?$	17. $10\frac{1}{2} - 7\frac{5}{8} = ?$
2. $4\frac{1}{2} - 2\frac{3}{4} = ?$	10. $4\frac{1}{3} - 3\frac{1}{2} = ?$	18. $11\frac{2}{3} - 8\frac{3}{4} = ?$
3. $5\frac{1}{2} - 3\frac{3}{4} = ?$	11. $5\frac{2}{3} - 2\frac{3}{4} = ?$	19. $7\frac{1}{3} - 4\frac{5}{12} = ?$
4. $6\frac{1}{4} - 4\frac{1}{2} = ?$	12. $7\frac{1}{3} - 2\frac{5}{6} = ?$	20. $2\frac{1}{4} - 1\frac{5}{12} = ?$
5. $8\frac{1}{4} - 5\frac{3}{4} = ?$	13. $6\frac{1}{3} - 1\frac{5}{6} = ?$	21. $12\frac{2}{3} - 7\frac{5}{6} = ?$
6. $9\frac{1}{4} - 7\frac{1}{2} = ?$	14. $9\frac{1}{3} - 5\frac{3}{4} = ?$	22. $13 - 7\frac{7}{8} = ?$
7. $3\frac{1}{3} - 2\frac{2}{3} = ?$	15. $9\frac{1}{2} - 4\frac{5}{6} = ?$	23. $15 - 11\frac{7}{12} = ?$
8. $7\frac{1}{3} - 4\frac{1}{2} = ?$	16. $8\frac{1}{2} - 3\frac{7}{8} = ?$	24. $12\frac{1}{2} - 9\frac{3}{4} = ?$

25. A man rode  $6\frac{1}{2}$  miles on horseback, and then walked a certain distance, when he was 10 miles from home. How far did he walk?

26. From a 17 lb. ham  $6\frac{1}{2}$  lb. are sold. How many pounds remain?

27. A 20 acre field has  $12\frac{1}{2}$  acres planted in rice and the remainder in sweet potatoes. How many acres are planted in sweet potatoes?

28. A boy has \$10 and pays  $\$8\frac{1}{2}$  for a suit of clothes. How much money has he left?

29.  $74\frac{1}{2}$  yards of twine are used from a spool containing 100 yards. How many yards are left?

30. San Antonio is 210 miles from Houston. After traveling  $97\frac{7}{10}$  miles from Houston in the direction of San Antonio, how far is it to San Antonio?

31. From a farm containing 150 acres  $97\frac{3}{4}$  acres are sold. How many acres remain in the farm?

32. Two steers weigh 1980 lb. One of them weighs  $1010\frac{1}{2}$  lb. What does the other weigh?

33. A man pays a debt of  $\$12\frac{3}{4}$  with a  $\$20$  gold piece. How much change should he get?

34. Two turkeys weigh  $20\frac{1}{2}$  pounds. The weight of one of the turkeys is  $10\frac{3}{4}$  pounds. What does the other turkey weigh?

35. Two horses weigh a ton (2,000 pounds); one of them weighs  $1,067\frac{1}{2}$  pounds. What does the other horse weigh?

36. A boy has  $\$1\frac{1}{2}$  and spends  $\$2\frac{1}{2}$ . What part of a dollar has he left?

37. From a can containing  $4\frac{1}{2}$  gallons of oil,  $\frac{2}{3}$  of a gallon leaked. How many gallons of oil remained in the can?

38. A field containing  $12\frac{1}{8}$  acres is planted in corn and oats.  $5\frac{3}{4}$  acres are planted in corn. How many acres are planted in oats?

39. There are  $10\frac{1}{2}$  pounds of sugar in a sack. How many pounds of sugar will be in the sack after  $3\frac{3}{4}$  pounds are used?

### MULTIPLICATION

Multiply  $\frac{2}{3}$  by 8.

2 thirds

8

$\frac{16}{16}$  thirds.  $16$  thirds  $= \frac{16}{3} = 5\frac{1}{3}$ .

Multiply  $\frac{3}{4}$  by 6.

3 fourths

6

$\frac{18}{18}$  fourths.  $18$  fourths  $= \frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$ .

To multiply a fraction by a whole number, multiply the numerator of the fraction by the whole number and write the product over the denominator. If the resulting fraction is an improper fraction, reduce it to a mixed number.

Multiply  $\frac{7}{8}$  by 12.

$$\frac{7}{8} \times 12 = \frac{7 \times 12}{8} = \frac{7 \times 3}{2} = \frac{21}{2} = 10\frac{1}{2}.$$

First, indicate the product. Second, if the numerator and denominator of the indicated product contain a common factor, we can shorten the work by dividing the terms by this common factor before performing the multiplication.

**EXERCISE 26 (Written)**

Multiply :

1. $\frac{1}{3}$ by 5.	11. $\frac{5}{6}$ by 12.	21. $\frac{3}{4}$ by 14.
2. $\frac{1}{2}$ by 7.	12. $\frac{5}{8}$ by 4.	22. $\frac{3}{5}$ by 7.
3. $\frac{2}{3}$ by 9.	13. $\frac{9}{10}$ by 10.	23. $\frac{4}{5}$ by 10.
4. $\frac{3}{4}$ by 10.	14. $\frac{11}{12}$ by 8.	24. $\frac{6}{7}$ by 7.
5. $\frac{7}{8}$ by 4.	15. $\frac{7}{12}$ by 12.	25. $\frac{3}{7}$ by 11.
6. $\frac{9}{10}$ by 5.	16. $\frac{5}{12}$ by 10.	26. $\frac{5}{7}$ by 14.
7. $\frac{7}{10}$ by 8.	17. $\frac{5}{9}$ by 3.	27. $\frac{7}{11}$ by 11.
8. $\frac{3}{10}$ by 12.	18. $\frac{8}{9}$ by 9.	28. $\frac{10}{11}$ by 22.
9. $\frac{3}{8}$ by 8.	19. $\frac{4}{9}$ by 12.	29. $\frac{5}{11}$ by 8.
10. $\frac{2}{3}$ by 6.	20. $\frac{5}{8}$ by 6.	30. $\frac{7}{8}$ by 9.

$$\frac{3}{4} \text{ of } 7 = ?$$

$$\frac{1}{4} \text{ of } 7 = \frac{7}{4}$$

$$\text{Therefore, } \frac{3}{4} \text{ of } 7 = 3 \times \frac{7}{4} = \frac{3 \times 7}{4} = \frac{21}{4} = 5\frac{1}{4}$$

**EXERCISE 27 (Written)**

1. $\frac{1}{2}$ of 11 = ?	8. $\frac{2}{3}$ of 27 = ?	15. $\frac{7}{12}$ of 18 = ?
2. $\frac{2}{3}$ of 8 = ?	9. $\frac{3}{8}$ of 12 = ?	16. $\frac{5}{12}$ of 16 = ?
3. $\frac{3}{4}$ of 15 = ?	10. $\frac{7}{8}$ of 20 = ?	17. $\frac{7}{10}$ of 15 = ?
4. $\frac{3}{5}$ of 20 = ?	11. $\frac{5}{8}$ of 18 = ?	18. $\frac{3}{10}$ of 25 = ?
5. $\frac{2}{5}$ of 18 = ?	12. $\frac{5}{9}$ of 12 = ?	19. $\frac{9}{10}$ of 35 = ?
6. $\frac{1}{6}$ of 21 = ?	13. $\frac{4}{9}$ of 15 = ?	20. $\frac{11}{12}$ of 20 = ?
7. $\frac{5}{8}$ of 15 = ?	14. $\frac{6}{7}$ of 21 = ?	21. $\frac{3}{8}$ of 28 = ?

Multiply  $1\frac{3}{4}$  by 7.

$$\begin{array}{r}
 1\frac{3}{4} \quad \text{First, multiply } \frac{3}{4} \text{ by 7. Write the result,} \\
 \underline{7} \quad 5\frac{1}{4} \quad \text{Second, multiply 1 by 7. Write the} \\
 \underline{5\frac{1}{4}} \quad \text{result, 7. Third, add the two partial prod-} \\
 \underline{7} \quad \text{ucts.} \\
 \hline
 12\frac{1}{4}
 \end{array}$$

**EXERCISE 28 (Written)**

1. $1\frac{1}{2}$ by 6 = ?	9. $2\frac{5}{6}$ by 3 = ?	17. $1\frac{9}{10}$ by 15 = ?
2. $1\frac{1}{4}$ by 10 = ?	10. $5\frac{1}{6}$ by 8 = ?	18. $4\frac{5}{12}$ by 8 = ?
3. $1\frac{3}{4}$ by 6 = ?	11. $4\frac{1}{9}$ by 3 = ?	19. $3\frac{7}{12}$ by 6 = ?
4. $1\frac{1}{5}$ by 10 = ?	12. $6\frac{5}{9}$ by 12 = ?	20. $2\frac{11}{12}$ by 4 = ?
5. $1\frac{3}{5}$ by 6 = ?	13. $7\frac{7}{9}$ by 15 = ?	21. $5\frac{5}{8}$ by 4 = ?
6. $1\frac{4}{5}$ by 15 = ?	14. $8\frac{1}{6}$ by 11 = ?	22. $6\frac{7}{8}$ by 10 = ?
7. $1\frac{2}{3}$ by 7 = ?	15. $1\frac{1}{10}$ by 12 = ?	23. $9\frac{5}{6}$ by 3 = ?
8. $4\frac{1}{3}$ by 5 = ?	16. $1\frac{3}{10}$ by 5 = ?	24. $7\frac{2}{3}$ by 12 = ?

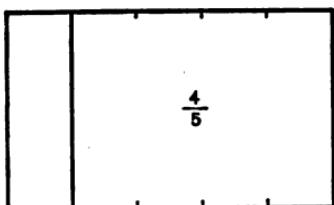


FIG. 1



FIG. 2

$\frac{2}{3}$  of  $\frac{4}{5} = ?$  How many small rectangles are in Fig. 2? How many small rectangles are in  $\frac{4}{5}$  of Fig. 2? How many small rectangles are in  $\frac{1}{3}$  of Fig. 2? How many small rectangles are in  $\frac{1}{3}$  of  $\frac{4}{5}$  of Fig. 2? How many small rectangles are in  $\frac{2}{3}$  of  $\frac{4}{5}$  of Fig. 2? What part of Fig. 2 is  $\frac{2}{3}$  of  $\frac{4}{5}$  of it?

$$\frac{2}{3} \text{ of } \frac{4}{5} = \frac{2 \times 4}{3 \times 5} = \frac{8}{15}$$

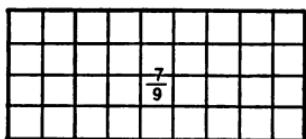


FIG. 3

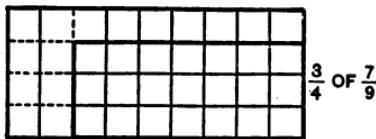


FIG. 4

$\frac{3}{4}$  of  $\frac{7}{9} = ?$  How many squares are in Fig. 3? How many squares are in  $\frac{7}{9}$  of Fig. 3? How many squares are in  $\frac{1}{4}$  of  $\frac{7}{9}$  of Fig. 4? How many squares are in  $\frac{3}{4}$  of  $\frac{7}{9}$  of Fig. 4? What part of Fig. 4 is  $\frac{3}{4}$  of  $\frac{7}{9}$  of the figure?

$$\frac{3}{4} \text{ of } \frac{7}{9} = \frac{3 \times 7}{4 \times 9} = \frac{7}{12}$$

## EXERCISE 29 (Written)

1. $\frac{2}{3}$ of $\frac{3}{4}$ = ?	8. $\frac{4}{5}$ of $\frac{5}{8}$ = ?	15. $\frac{9}{10} \times \frac{5}{9}$ = ?
2. $\frac{3}{4}$ of $\frac{8}{9}$ = ?	9. $\frac{9}{10}$ of $\frac{2}{3}$ = ?	16. $\frac{9}{16} \times \frac{8}{11}$ = ?
3. $\frac{5}{6}$ of $\frac{7}{10}$ = ?	10. $\frac{7}{12}$ of $\frac{6}{7}$ = ?	17. $\frac{7}{16} \times \frac{4}{21}$ = ?
4. $\frac{7}{8}$ of $\frac{4}{5}$ = ?	11. $\frac{5}{12}$ of $\frac{4}{5}$ = ?	18. $\frac{5}{16} \times \frac{3}{5}$ = ?
5. $\frac{5}{8}$ of $\frac{9}{10}$ = ?	12. $\frac{11}{12}$ of $\frac{10}{11}$ = ?	19. $\frac{13}{20} \times \frac{5}{8}$ = ?
6. $\frac{3}{8}$ of $\frac{7}{9}$ = ?	13. $\frac{8}{15}$ of $\frac{5}{9}$ = ?	20. $\frac{17}{20} \times \frac{10}{11}$ = ?
7. $\frac{3}{4}$ of $\frac{5}{9}$ = ?	14. $\frac{7}{15}$ of $\frac{6}{7}$ = ?	21. $\frac{11}{18} \times \frac{9}{22}$ = ?

Multiply  $1\frac{1}{2}$  by  $1\frac{1}{3}$ .

Change each of these mixed numbers to improper fractions, and then proceed as in the last exercise.

$$\begin{array}{rcl} 1 & 2 & \\ \frac{1}{2} = \frac{3}{2}: & \frac{3}{2} \times \frac{4}{3} = \frac{1 \times 2}{1 \times 1} = 2. & \\ 1\frac{1}{3} = \frac{4}{3}. & 1 & 1 \end{array}$$

## EXERCISE 30 (Written)

1. $1\frac{1}{4} \times 1\frac{1}{7}$ = ?	6. $1\frac{5}{6} \times 1\frac{1}{2}$ = ?	11. $1\frac{3}{4} \times 1\frac{1}{7}$ = ?
2. $2\frac{3}{4} \times 1\frac{3}{11}$ = ?	7. $1\frac{2}{7} \times 4\frac{2}{3}$ = ?	12. $2\frac{1}{6} \times 1\frac{2}{13}$ = ?
3. $2\frac{1}{2} \times 2\frac{1}{2}$ = ?	8. $1\frac{1}{6} \times 1\frac{1}{5}$ = ?	13. $1\frac{4}{11} \times 1\frac{1}{10}$ = ?
4. $3\frac{1}{2} \times 3\frac{1}{2}$ = ?	9. $5\frac{1}{2} \times 5\frac{1}{2}$ = ?	14. $2\frac{7}{9} \times 2\frac{4}{5}$ = ?
5. $4\frac{1}{2} \times 1\frac{1}{3}$ = ?	10. $1\frac{2}{3} \times 1\frac{2}{5}$ = ?	15. $3\frac{5}{9} \times 1\frac{9}{16}$ = ?

16. Find the cost of  $2\frac{1}{2}$  lb. of butter at  $\$4\frac{1}{2}$  per lb.

17. What is the value of  $2\frac{1}{3}$  acres of land at  $\$7\frac{1}{2}$  per acre?

18. What is the value of  $4\frac{1}{2}$  bbl. of flour at  $\$4\frac{4}{5}$  per bbl.?

19. Multiply  $7\frac{2}{3}$  by  $5\frac{3}{4}$ .

$\frac{2}{3}$  of an acre of wheat yields 14 bu. What will 1 acre yield?

$\frac{2}{3}$  of an acre yields 14 bu.

Therefore,  $\frac{1}{3}$  of an acre yields  $\frac{1}{2}$  of 14 bu.

And  $\frac{3}{3}$  of an acre yields 3 times  $\frac{1}{2}$  of 14 bu. which is 21 bu.

Hence, an acre yields 21 bu.

$\frac{3}{4}$  of what number equals 36?

$\frac{3}{4}$  of a number = 36.

Therefore,  $\frac{1}{4}$  of the number =  $\frac{1}{3}$  of 36 which is 12.

Therefore  $\frac{4}{4}$  of the number =  $4 \times 12$  which is 48.

Hence, the number is 48.

#### EXERCISE 31

1.  $\frac{2}{3}$  of a boy's money is 20¢. How many cents has he?

2.  $\frac{3}{4}$  of the distance between two cities is 18 mi. How many miles apart are the cities?

3. A train runs 24 mi. in  $\frac{2}{3}$  of an hour. How far will it run in 1 hr.?

4. A carpenter earns 48¢ in  $\frac{1}{5}$  of an hour. How much does he earn in 1 hr.?

5. A boy works 6 examples in  $\frac{3}{5}$  of an hour. How many examples will he work in 1 hr.?

6.  $\frac{4}{5}$  of a flock of sheep are 80. How many sheep are in the flock?

7. In a class 35 pupils are promoted. This number is  $\frac{5}{7}$  of the number in the class. How many pupils are in the class?

## DIVISION

Divide  $5\frac{3}{4}$  by 8.

To divide a number by 8 means to take the eighth part of it.

$$\frac{1}{8} \text{ of } 5\frac{3}{4} = \frac{1}{8} \times \frac{23}{4} = \frac{23}{32}.$$

## EXERCISE 32 (Written)

Divide :

1. $2\frac{3}{4}$ by 2.	6. $6\frac{7}{8}$ by 11.	11. $5\frac{5}{11}$ by 12.
2. $1\frac{1}{2}$ by 3.	7. $6\frac{3}{4}$ by 9.	12. $13\frac{5}{7}$ by 16.
3. $4\frac{1}{2}$ by 6.	8. $8\frac{3}{8}$ by 10.	13. $5\frac{5}{9}$ by 20.
4. $9\frac{2}{3}$ by 4.	9. $3\frac{8}{9}$ by 7.	14. $3\frac{7}{11}$ by 8.
5. $5\frac{5}{8}$ by 3.	10. $4\frac{1}{11}$ by 6.	15. $8\frac{2}{11}$ by 18.

Divide  $\frac{5}{6}$  by  $\frac{3}{4}$ .

$\frac{3}{4}$  of the quotient =  $\frac{5}{6}$ .

Therefore  $\frac{1}{4}$  of the quotient =  $\frac{1}{3}$  of  $\frac{5}{6}$ .

Therefore  $\frac{4}{4}$  of the quotient =  $4 \times \frac{1}{3}$  of  $\frac{5}{6}$ .

Quotient =  $\frac{4}{3}$  of  $\frac{5}{6}$  =  $1\frac{1}{6}$ .

Hence the rule for division — invert the terms of the divisor and then proceed as in multiplication.

## EXERCISE 33 (Written)

1. $6 \div \frac{2}{3} = ?$	7. $3\frac{3}{4} \div \frac{10}{11} = ?$	13. $1\frac{3}{4} \div \frac{7}{8} = ?$
2. $9 \div \frac{3}{4} = ?$	8. $2\frac{1}{6} \div \frac{13}{15} = ?$	14. $2\frac{1}{7} \div \frac{3}{7} = ?$
3. $7\frac{1}{2} \div \frac{3}{4} = ?$	9. $5\frac{4}{5} \div \frac{8}{9} = ?$	15. $2\frac{2}{9} \div \frac{4}{5} = ?$
4. $\frac{3}{4} \div \frac{2}{3} = ?$	10. $4\frac{1}{6} \div \frac{10}{13} = ?$	16. $1\frac{10}{11} \div \frac{4}{11} = ?$
5. $1\frac{7}{11} \div \frac{5}{6} = ?$	11. $\frac{9}{10} \div \frac{8}{15} = ?$	17. $2\frac{1}{12} \div \frac{5}{8} = ?$
6. $2\frac{2}{3} \div \frac{4}{5} = ?$	12. $\frac{7}{8} \div \frac{7}{9} = ?$	18. $10\frac{2}{3} \div \frac{6}{11} = ?$

Divide  $79\frac{1}{4}$  by 3.

$$\begin{array}{r} 3)79\frac{1}{4} \\ \underline{26\frac{5}{12}} \\ 1\frac{5}{12} \end{array}$$
 Dividing 79 by 3, we get 26 for quotient, and 1 remainder. Dividing  $1\frac{1}{4}$  by 3, we get  $\frac{5}{12}$ . The answer is  $26\frac{5}{12}$ .

**EXERCISE 34 (Written)**

1. $68\frac{2}{3} \div 4 = ?$	5. $36\frac{6}{11} \div 6 = ?$	9. $83\frac{1}{3} \div 10 = ?$
2. $18\frac{1}{2} \div 5 = ?$	6. $38\frac{8}{9} \div 5 = ?$	10. $77\frac{7}{9} \div 14 = ?$
3. $24\frac{4}{5} \div 4 = ?$	7. $37\frac{1}{2} \div 5 = ?$	11. $46\frac{2}{3} \div 12 = ?$
4. $25\frac{5}{8} \div 5 = ?$	8. $66\frac{2}{3} \div 8 = ?$	12. $64\frac{4}{7} \div 9 = ?$

REVIEW OF FRACTIONS

**EXERCISE 35 (Written)**

1. Which is greater,  $\frac{3}{4}$  or  $\frac{4}{5}$ ?
2. What number must be added to the sum of  $1\frac{1}{2}$  and  $2\frac{1}{3}$  to make 5?
3. What number must be taken from  $4\frac{1}{3}$  to leave for a remainder  $\frac{5}{6}$ ?
4. A man has  $\$12\frac{1}{2}$  and spends  $\$5\frac{3}{4}$ . How many dollars has he left?
5. A man has a ten-dollar bill. How much will he have left after spending  $\$2\frac{3}{4}$  and  $\$4\frac{2}{5}$ ?
6. Find the cost of 6 pounds of sugar at  $4\frac{1}{2}\text{¢}$  a pound.
7. Find the cost of 5 bushels of wheat at  $79\frac{1}{2}\text{¢}$  a bushel.
8. Find the cost of  $6\frac{1}{2}$  yards of muslin at  $7\frac{1}{2}\text{¢}$  a yard.

9. What will 10 bushels of oats cost at  $29\frac{1}{4}$ ¢ a bushel?
10. What will  $8\frac{1}{2}$  pounds of meat cost at  $12\frac{1}{2}$ ¢ a pound?
11. What will  $1\frac{1}{2}$  pounds of tea cost at 56¢ a pound?
12. A farmer sold  $5\frac{1}{2}$  acres of land at  $\$25\frac{1}{2}$  an acre. How much did he receive for his land?
13. A coal dealer sells  $\frac{1}{3}$ ,  $\frac{1}{4}$ , and  $\frac{1}{6}$  of his coal. What fraction of his coal remains unsold?
14. A man dying, leaves  $\frac{1}{3}$  of his property to his widow,  $\frac{1}{6}$  to each of his two sons, and the remainder for charitable purposes. What part of his property does he leave for charitable purposes?
15. A farmer bought a flock of sheep;  $\frac{1}{6}$  of them died during the winter,  $\frac{1}{2}$  of them were killed by wolves, and he sold the remainder in the spring. What part of the original flock did he sell?
16. A tract of land consisting of  $78\frac{3}{4}$  acres was divided equally among 6 people. How many acres did each receive?
17. If 6 pounds of tea are bought for \$2, what is the price per pound?
18. If 8 pounds of sugar cost 36¢, what is the price per pound?
19. How many razors at  $\$1\frac{1}{2}$  apiece can be bought for  $\$10\frac{1}{2}$ ?
20. How many heating stoves at  $\$5\frac{1}{2}$  apiece can be bought for  $\$26\frac{1}{4}$ ?

21. How many hats at  $\$1\frac{3}{4}$  apiece can be bought for  $\$15\frac{3}{4}$ ?

22. How many pairs of shoes at  $\$2\frac{3}{4}$  a pair can be bought for  $\$35\frac{3}{4}$ ?

23. A brick mason works  $5\frac{1}{2}$  days at  $\$4\frac{1}{2}$  a day. How much money does he earn?

24. How many days must a laborer work at  $\$1\frac{3}{4}$  a day to earn  $\$70$ ?

25. A carpenter earns  $\$3\frac{1}{5}$  a day. How many days must he work to earn  $\$102\frac{2}{5}$ ?

26. How many bushels of wheat at  $84\frac{3}{4}$ ¢ a bushel must be sold to pay for a ton of coal which costs  $\$6.75$ ?

27. The quotient is  $1\frac{1}{2}$  and the dividend is  $2\frac{1}{4}$ . Find the divisor.

28. The multiplier is  $3\frac{3}{4}$  and the product is  $37\frac{1}{2}$ . Find the multiplicand.

29. The remainder is  $1\frac{1}{2}$  and the minuend is  $5\frac{1}{8}$ . Find the subtrahend.

### RELATION OF NUMBERS

#### EXERCISE 36 (Oral)

1. What part of a foot is 1 inch? What part of a foot is 2 inches? What part of a foot is 3 inches? 4 inches? 5 inches? 6 inches? 7 inches? 9 inches? 10 inches?

2. What part of a day is 1 hour? 2 hours? 3 hours? 4 hours? 5 hours? 6 hours? 8 hours? 9 hours? 15 hours? 16 hours? 18 hours? 20 hours?

3. What part of an hour is 1 minute? 2 minutes? 3 minutes? 5 minutes? 6 minutes? 10 minutes? 13 minutes? 15 minutes? 25 minutes? 36 minutes?

4. What part of a bushel is 1 quart? 2 quarts? 4 quarts? 5 quarts? 7 quarts? 9 quarts? 12 quarts? 16 quarts? 20 quarts? 24 quarts? 28 quarts?

5. What part of a yard is 1 inch? 2 inches? 3 inches? 4 inches? 5 inches? 8 inches? 11 inches? 15 inches? 16 inches? 20 inches? 24 inches? 30 inches? 33 inches?

6. What part of \$1 is 1¢? 2¢? 3¢? 4¢? 5¢? 6¢? 7¢? 9¢? 11¢? 15¢? 18¢? 20¢? 23¢? 25¢? 30¢? 31¢? 35¢? 40¢? 45¢? 50¢? 56¢? 60¢? 70¢? 75¢? 80¢? 90¢? 95¢?

7. What part of a gallon is 1 pint? 2 pints? 3 pints? 4 pints? 5 pints? 7 pints?

8. What part of 1 gallon is 1 quart? 2 quarts? 3 quarts?

9. What part of a yard is 6 inches? 11 inches? 1 foot 1 inch? 1 foot 2 inches? 1 foot 5 inches? 1 foot 9 inches? 2 feet 1 inch? 2 feet 4 inches? 2 feet 10 inches?

10. There are 30 days in a commercial month. What part of a commercial month is 1 day? 2 days? 3 days? 4 days? 5 days? 6 days? 7 days? 9 days? 10 days? 12 days? 14 days? 15 days? 18 days? 20 days? 21 days? 24 days? 27 days?

11. There are 365 days in a common year. What part of a common year is 1 day? 2 days? 3 days? 5

days? 7 days? 10 days? 12 days? 15 days? 20 days?  
25 days? 30 days? 40 days? 45 days? 50 days? 60  
days? 73 days? 90 days? 100 days? 110 days? 120  
days? 146 days? 150 days? 170 days? 180 days?  
200 days? 219 days? 250 days? 292 days?

12. What part of a year is 1 month? 2 months?  
3 months? 4 months? 5 months? 6 months? 7  
months? 8 months? 9 months? 10 months? 11  
months?

13. There are 1,760 yards in one mile. What part  
of a mile is 1 yard? 2 yards? 5 yards? 8 yards? 10  
yards? 12 yards? 20 yards? 30 yards? 40 yards? 60  
yards? 80 yards? 88 yards? 100 yards? 176 yards?  
220 yards? 352 yards? 440 yards? 880 yards? 704  
yards? 1,056 yards?

**EXERCISE 37 (Oral)**

What fraction of :

1. 4 is 1? 4 is 2? 4 is 3?
2. 6 is 1? 6 is 2? 6 is 3? 6 is 4? 6 is 5?
3. 8 is 1? 8 is 2? 8 is 3? 8 is 4? 8 is 6? 8 is 7?
4. 10 is 1? 10 is 2? 10 is 3? 10 is 4? 10 is 5? 10  
is 6? 10 is 8?
5. 12 is 1? 12 is 2? 12 is 3? 12 is 4? 12 is 6? 12  
is 8? 12 is 10?
6. 20 is 1? 20 is 2? 20 is 4? 20 is 5? 20 is 8? 20  
is 10? 20 is 12? 20 is 15? 20 is 18?
7. 30 is 1? 30 is 3? 30 is 4? 30 is 5? 30 is 6? 30  
is 9? 30 is 12? 30 is 15? 30 is 18? 30 is 20? 30  
is 24? 30 is 27?

a. 100 is 5? 100 is 10? 100 is 15? 100 is 20?  
 100 is 25? 100 is 30? 100 is 50? 100 is 75?

9. What fraction of 2 feet 3 inches is 3 inches? 6 inches? 9 inches? 12 inches? 1 foot 3 inches? 1 foot 6 inches? 1 foot 9 inches?

**EXERCISE 38 (Oral)**

1. What is  $\frac{1}{3}$  of 2? What is  $\frac{2}{3}$  of 1?
2. What is  $\frac{1}{4}$  of 3? What is  $\frac{3}{4}$  of 1?
3. What is  $\frac{1}{5}$  of 2? What is  $\frac{2}{5}$  of 1?
4. What is  $\frac{1}{7}$  of 3? What is  $\frac{3}{7}$  of 1?
5. What is  $\frac{1}{8}$  of 5? What is  $\frac{5}{8}$  of 1?
6. What is  $\frac{1}{9}$  of 4? What is  $\frac{4}{9}$  of 1?

The fraction  $\frac{2}{3}$  may be read either of two ways, one third of two, or two thirds of one.

The fraction  $\frac{3}{4}$  may be read either of two ways, one fourth of three, or three fourths of one.

The fraction  $\frac{4}{9}$  may be read either of two ways, one ninth of four, or four ninths of one.

Take the fraction  $\frac{17}{3}$ . This means  $\frac{1}{3}$  of 17, or 17 thirds.

$$\frac{1}{3} \text{ of } 17 = 5\frac{2}{3}.$$

$$17 \div 3 = 5\frac{2}{3}.$$

Hence, division is indicated in two ways, namely, by  $\div$ , and by writing the dividend above the horizontal line and the divisor below the same horizontal line.

**EXERCISE 39 (Oral). RATIO**

1. How does 2 compare with 4? *Ans. 2 is  $\frac{2}{4}$  of 4, or  $\frac{1}{2}$  of 4.*
2. How does 3 compare with 5?
3. How does 4 compare with 5?
4. How does 2 compare with 7?
5. How does 2 compare with 8?
6. How does 3 compare with 9?
7. How does 4 compare with 10?
8. How does 6 compare with 10?
9. How does 6 compare with 15?
10. How does 10 compare with 15?
11. How does 8 compare with 20?
12. How does 12 compare with 20?
13. How does 8 compare with 24?
14. How does 16 compare with 24?
15. How does 18 compare with 24?
16. How does 20 compare with 24?
17. How do you find how large one number is compared with another number?

When we compare two numbers, or two quantities of the same kind, the quotient obtained by dividing the first number by the second number is called the **ratio** of the first number to the second number.

## NOTATION

3 : 5 means how large is 3 compared with 5; that is, it indicates the ratio of 3 to 5.

## EXERCISE 40 (Oral)

Find the values of the following ratios:

1. 6 : 9.	11. 24 : 32.	21. 10¢ : \$1.
2. 8 : 12.	12. 24 : 40.	22. 15¢ : \$1.
3. 4 : 10.	13. 32 : 40.	23. 20¢ : \$1.
4. 12 : 21.	14. 24 : 36.	24. 25¢ : \$1.
5. 16 : 24.	15. 12 : 30.	25. $16\frac{2}{3}\text{¢}$ : \$1.
6. 18 : 32.	16. 18 : 30.	26. 75¢ : \$1.
7. 16 : 36.	17. 20 : 32.	27. 16 inches : 1 yard.
8. 15 : 25.	18. 25 : 60.	28. 40 minutes : 1 hour.
9. 20 : 30.	19. 24 : 60.	29. 440 yards : 1 mile.
10. 18 : 24.	20. 27 : 60.	30. 16 hours : 1 day.

## DECIMALS

Write any number of dollars and cents; for example, \$ 5.55.

We have seen that this may be read, 5 dollars, 5 dimes, and 5 cents. We have seen also that 1 dime =  $\frac{1}{10}$  of \$1, and that  $1\text{¢} = \frac{1}{10}$  of one dime, or  $\frac{1}{100}$  of a dollar. Consequently, 5 dimes =  $\frac{5}{10}$  of 1 dollar, and  $5\text{¢} = \frac{5}{10}$  of 1 dime, or  $\frac{5}{100}$  of 1 dollar.

In our notation for dollars and cents, 5 written in the first place after the decimal point denotes 5 tenths of \$1; 5 written in the second place after the decimal point denotes 5 hundredths of \$1.

In our decimal system of notation a figure in the first place after the decimal point denotes so many tenths. Thus, 4 written in the first place after the decimal point denotes 4 tenths. 4 in the second place to the right of the decimal point denotes 4 hundredths, or it is one tenth of the value of the 4 on its left. 4 written in the third place after the decimal point denotes 4 thousandths, or it is one tenth of the value of the 4 written on its left. If we write 4 in the fourth place after the decimal point, it denotes 4 ten-thousandths, or it is one tenth of the value of the 4 to its left, and so on.

Starting from the units' place, if we go to the left, we have tens, hundreds, thousands, ten-thousands, etc. If we go to the right from the units' place, we have tenths, hundredths, thousandths, ten-thousandths, etc., in succession.

What do the figures 6.234 denote? *Ans.* 6 ones  
 $+\frac{2}{10}+\frac{3}{100}+\frac{4}{1000}$ .

$$\frac{4}{1000} = \frac{4}{1000}.$$

$$\frac{3}{100} = \frac{30}{1000}.$$

$$\frac{2}{10} = \frac{20}{100} = \frac{200}{1000}.$$

$$\text{Therefore, } \frac{2}{10} + \frac{3}{100} + \frac{4}{1000} = \frac{200}{1000} + \frac{30}{1000} + \frac{4}{1000} = \frac{234}{1000}.$$

Hence, 6.234 is read 6 and 234 thousandths.

.145 is read 145 thousandths. 7.023 is read 7 and 23 thousandths.

.078 is read 78 thousandths. 12.0379 is read 12 and 379 ten-thousandths.

**EXERCISE 41 (Oral and Written)****Read :**

1. .24; 7.01; 9.08; 8.12; 15.83; 27.45; 100.01; 2,000.06.
2. 5.274; 8.569; 9.301; 200.506; 800.947; 1,000.602; 3,000.523.
3. 10.073; 15.085; 27.032; 18.011; 208.022; 506.035; 704.098.
4. 11.7632; 29.6349; 3.1416; 1.07958; 57.0572; 8.0039; 9.0008.
5. 6.23584; 9.38123; 10.72965; 12.04012; 20.03096; 17.00012.

**Write in figures :**

1. Twenty-five hundredths. Seventy-two hundredths. Sixty-four hundredths. Nine hundredths. Eight hundredths. Eighty-four hundredths. Ninety-five hundredths. Four hundredths. Ninety-three hundredths.
2. Write in figures four hundred sixty-five ten-thousandths. To express this number in figures, we write 465 as if it were a whole number, making the 5 occupy the fourth place by placing a cipher before the 4 and writing the decimal point. We then have .0465.

Write in figures twenty-five hundred-thousandths. To express this number in figures, we write 25 as if it were a whole number, making the 5 occupy the fifth place by placing three ciphers before the 2 and writing the decimal point. Doing this, we have

.00025.

3. Express in figures one hundred fifty-four thousandths. Six hundred twenty-eight thousandths. Four hundred fifteen thousandths.

4. Express in figures: Four hundred fifty-six thousandths. Sixty-seven thousandths. Twenty-three thousandths. Fifty-three thousandths. Eighty-one thousandths. Four thousandths. Seven thousandths. Six thousandths. Five thousandths.

5. Four thousand three hundred twenty-nine ten-thousandths. Five thousand five ten-thousandths. Seven thousand three ten-thousandths. Two hundred eighteen ten-thousandths. Fifty-six ten-thousandths. One hundred one ten-thousandths. Eight ten-thousandths. Five ten-thousandths. Nine ten-thousandths.

6. Write in figures one hundred ten and seventeen thousandths. This number is written

110.017.

In reading numbers, we never use the word *and* except when we have a whole number and a decimal as in the example above.

Write in figures five hundred and five thousandths. This number is written

500.005.

7. Express in figures: Five hundred and twenty-five hundredths. Four hundred and four hundredths. Six hundred twenty and twenty-three thousandths. One thousand and two thousandths. Two thousand and one hundred one thousandths. Four hundred and

five thousandths. Six thousand one hundred five and five tenths. One hundred and one thousandth. Five hundred three and three hundredths. Seven hundred and ten thousandths.

### ADDITION

Add :

23.154	To add decimals we first arrange
19.3482	the numbers so that units of the same
5.5	name stand in the same vertical column
5724.56	and the decimal points stand in the
392.3209	same vertical line.
75.101	We then proceed as in the addition
6239.9841	of whole numbers.

### EXERCISE 42 (Written)

Add :	(1)	(2)	(3)	(4)	
	24.75	16.74	19.81	18.34	
	17.39	19.29	27.32	39.87	
	93.54	16.01	17.09	92.08	
	83.58	75.73	94.92	86.38	
	27.23	54.94	89.23	87.39	
	56.09	94.92	76.54	39.23	
	(5)	(6)	(7)	(8)	(9)
18.826	37.394	38.732	36.456	85.39	92.193
33.66	17.99	39.692	34.945	31.738	38.654
24.931	25.129	36.273	39.5	47.479	98.95
56.839	38.92	46.769	94.653	91.08	99.09
69.648	68.763	97.74	93.135	72.7	98.679
59 735	54.821	53.69	92.593	61.948	79.987

11.  $13.25 + 19.38 + 57.11 + 11.49 + 94.49 + 52.76 + 66.76 = ?$

12.  $23.45 + 29.23 + 34.98 + 39.49 + 28.35 + 27.26 + 22.83 = ?$

13.  $35.75 + 95.43 + 34.15 + 40.09 + 36.08 + 99.99 + 77.77 = ?$

14.  $64.35 + 69.84 + 31.29 + 36.73 + 25.18 + 31.52 + 69.98 = ?$

15.  $47.35 + 53.74 + 91.14 + 79.87 + 76.79 + 35.09 + 18.5 = ?$

16.  $64.14 + 36.95 + 83.92 + 92.28 + 82.765 + 89.351 + 19.737 = ?$

17.  $5.37 + 9.89 + 11.96 + 61.31 + 78.793 + 75.475 + 76.848 = ?$

18.  $7.946 + 11.963 + 17.05 + 91.738 + 97.275 + 3.948 + 71.976 = ?$

### SUBTRACTION

From 72.01 take 1.623.

72.01      To subtract decimals, we first arrange  
1.623      the numbers so that units of the same  
70.387      name stand in the same vertical column  
                    and the decimal points stand in the  
                    same vertical line. We then proceed as in sub-  
                    traction of whole numbers.

### EXERCISE 43 (Written)

(1)	(2)	(3)	(4)	(5)	(6)
56.32	84.17	19.54	91.08	93.25	94.41
<u>21.73</u>	<u>24.69</u>	<u>5.58</u>	<u>11.59</u>	<u>24.39</u>	<u>25.86</u>

(7)	(8)	(9)	(10)	(11)	(12)
85.15	71.1	96.53	29.73	18.5	9.284
<u>74.19</u>	<u>11.01</u>	<u>91.537</u>	<u>9.684</u>	<u>12.49</u>	<u>5.296</u>
(13)	(14)	(15)	(16)	(17)	(18)
8.63	74.52	68.01	12.	90.001	96.002
<u>7.391</u>	<u>11.835</u>	<u>9.023</u>	<u>4.768</u>	<u>7.09</u>	<u>18.95</u>
(19)	(20)	(21)	(22)	(23)	(24)
38.89	100.	27.01	153.74	9.463	11.196
<u>19.038</u>	<u>76.74</u>	<u>17.011</u>	<u>96.792</u>	<u>4.979</u>	<u>5.697</u>
(25)	(26)	(27)	(28)	(29)	(30)
4.823	9.365	8.493	9.475	7.005	43.236
<u>2.95</u>	<u>4.44</u>	<u>5.595</u>	<u>2.387</u>	<u>3.928</u>	<u>34.647</u>

## MULTIPLICATION

Multiply 5.393 by 8.

$$\begin{array}{r}
 5.393 \\
 \times 8 \\
 \hline
 43.144
 \end{array}$$
 8 times 3 thousandths are 24 thousandths.  
 24 thousandths equal 2 hundredths and 4 thousandths. Write 4 in the thousandths' place and carry 2 hundredths. 8 times 9 hundredths are 72 hundredths; 72 hundredths and 2 hundredths are 74 hundredths. 74 hundredths equal 7 tenths and 4 hundredths. Write the 4 hundredths in the hundredths' place and carry 7 tenths. 8 times 3 tenths are 24 tenths. 24 tenths and 7 tenths are 31 tenths. 31 tenths equal 3 ones and 1 tenth. Write 1 tenth and carry 3 ones. 8 times 5 are 40. 40 and 3 are 43. Write 43. The answer is 43.144.

We might shorten this work by multiplying as if both numbers were whole numbers, and then, commencing at the right of the product, point off as many decimal places as there are decimal figures in the multiplicand.

**EXERCISE 44 (Written)**

Multiply :

1. 7.23 by 4 ; by 6 ; by 7 ; by 8.
2. 9.462 by 3 ; by 5 ; by 7 ; by 9.
3. 8.305 by 7 ; by 8 ; by 9.
4. 9.025 by 6 ; by 9 ; by 12.
5. .125 by 6 ; by 8 ; by 14.
6. .0375 by 8 ; by 12 ; by 16.
7. .3125 by 4 ; by 8 ; by 9.
8. .0975 by 8 ; by 9 ; by 7.
9. .5436 by 9 ; by 10 ; by 8.
10. 3.25 by 100 ; by 7 ; by 6.

Multiply 3.6 by 2.5.

$$3.6 \quad 3.6 = 3\frac{6}{10} = \frac{36}{10}.$$

$$2.6 \quad 2.6 = 2\frac{6}{10} = \frac{26}{10}.$$

$$\underline{21.6}$$

$$\underline{72}$$

$$\underline{9.36} \quad \text{Therefore, } 3.6 \times 2.6 = 3\frac{6}{10} \times 2\frac{6}{10} = \frac{36}{10} \times \frac{26}{10} = \frac{936}{100} = 9\frac{36}{100}, \text{ or } 9.36.$$

Multiply the numbers as if both were whole numbers, then commencing at the right of the product, point off as many decimal places as there are decimal places in the multiplier and multiplicand combined.

## EXERCISE 45 (Written)

1. $1.3 \times 1.4 = ?$	13. $9.84 \times .18 = ?$
2. $1.6 \times 1.5 = ?$	14. $8.73 \times .24 = ?$
3. $1.7 \times 1.2 = ?$	15. $7.27 \times .28 = ?$
4. $1.8 \times 1.9 = ?$	16. $6.14 \times 1.1 = ?$
5. $2.4 \times 1.7 = ?$	17. $8.24 \times 3.2 = ?$
6. $2.5 \times 3.9 = ?$	18. $8.76 \times 2.1 = ?$
7. $12.5 \times 9.4 = ?$	19. $9.35 \times 4.8 = ?$
8. $23.8 \times 4.8 = ?$	20. $11.01 \times 5.6 = ?$
9. $27.2 \times 4.2 = ?$	21. $12.12 \times 6.4 = ?$
10. $2.68 \times 4.5 = ?$	22. $27.14 \times 7.2 = ?$
11. $3.54 \times 3.5 = ?$	23. $18.2 \times .75 = ?$
12. $4.47 \times .16 = ?$	24. $25.98 \times .25 = ?$

Multiply 2.39 by 10.

Multiplying in the usual manner, we get

2.39    23.90, or 23.9, since 0 has no value.

10    Noticing the multiplier and the multiplicand, we see this can be accomplished by moving the decimal point in the multiplicand one place to the right.

Multiply 5.895 by 100.

5.895    To multiply a number by 100, move  
100    the decimal point in the multiplicand two  
589.500    places to the right.

Multiply 7.854 by 1,000.

7.854    To multiply a number by 1,000, move  
1,000    the decimal point in the multiplicand  
7,854.000    three places to the right.

## EXERCISE 46 (Oral and Written)

1. Multiply by 10: 5.4; 7.82; 9.013; 8.64; 86; 720; 218.
2. Multiply by 100: 15.84; 19,952; 18.678; 4.4; 5.9; 77.
3. Multiply by 1,000: 15.635; .001; .053; .047; 7.1; 5.12; 9.

Divide 571.428 by 7.

$$\begin{array}{r} 7)571.428 \\ \underline{-49} \quad \text{7 is contained in 57, 8 times, 1} \\ \hline 81.428 \\ \underline{-56} \quad \text{7 is contained in 11,} \\ \hline 25.8 \\ \underline{-21} \quad \text{1 time, 4 remainder. The 4 re-} \\ \hline 48 \\ \underline{-42} \quad \text{mainder is 4 ones = 40 tenths. 40} \\ \hline 6 \end{array}$$

tenths and 4 tenths = 44 tenths.  $\frac{1}{7}$  of 44 tenths is 6 tenths, remainder 2 tenths. Changing 2 tenths to hundredths, we have 22 hundredths.  $\frac{1}{7}$  of 22 hundredths is 3 hundredths, remainder 1 hundredth. Changing the 1 hundredth to thousandths, we have 18 thousandths.  $\frac{1}{7}$  of 18 thousandths is 2 thousandths, remainder 4 thousandths. Changing 4 thousandths to ten-thousandths, we have 40 ten-thousandths.  $\frac{1}{7}$  of 40 ten-thousandths is 5 ten-thousandths, remainder 5 ten-thousandths. Changing 5 ten-thousandths to hundred-thousandths, we have 50 hundred-thousandths.  $\frac{1}{7}$  of 50 hundred-thousandths is 7 hundred-thousandths, etc. The answer is 81.63257 +.

The partial dividends in this example are 57 tens, 11 ones, 44 tenths, 22 hundredths, 18 thousandths, etc.

Hence, to divide a decimal number by a whole number, we divide each partial dividend by the divisor, and write the quotient figure in the same vertical column as the units' figure of the partial dividend producing it.

**EXERCISE 47 (Written)**

1. $17.64 \div 3 = ?$	8. $11.91 \div 4 = ?$
2. $19.62 \div 4 = ?$	9. $13.684 \div 7 = ?$
3. $25.18 \div 4 = ?$	10. $29.621 \div 7 = ?$
4. $93.01 \div 3 = ?$	11. $15.491 \div 8 = ?$
5. $74.73 \div 4 = ?$	12. $.593 \div 8 = ?$
6. $9.732 \div 4 = ?$	13. $5 \div 8 = ?$
7. $8.725 \div 5 = ?$	14. $7 \div 8 = ?$
15. $8 \div 9 = ?$	

Divide .0796 by .36.

$$\begin{array}{r}
 .2211 \\
 36) 7.96 \\
 \underline{72} \\
 76 \\
 \underline{72} \\
 40 \\
 \underline{36} \\
 40 \\
 \underline{36}
 \end{array}$$

First, we make a whole number out of the divisor by moving the decimal point two places to the right. Next, make a corresponding change in the dividend. Moving the decimal point two places to the right multiplies the number by 100. Multiplying the dividend and the divisor by the same number does not alter the quotient.

## EXERCISE 48 (Written)

Divide:

1. .2401 by .07.	16. 1.3 by .08.
2. .4096 by .08.	17. 2.1 by .03.
3. .5184 by .09.	18. 17.2225 by .83.
4. .9604 by 1.4.	19. 1.35424 by .92.
5. .9216 by 1.6.	20. 1.19025 by .69.
6. .9025 by 1.9.	21. 19.7136 by .74.
7. 2.8224 by 2.4.	22. 1.78929 by .47.
8. 1.1664 by .18.	23. .213444 by .77.
9. 1.6384 by .32.	24. .186624 by .48.
10. 3.5721 by .63.	25. .126736 by .89.
11. 1.50544 by .97.	26. 57.1536 by 1.08.
12. 1.37641 by .53.	27. 15.4 by 12.5.
13. 11.6964 by 5.7.	28. 18.3 by 1.6.
14. .0792 by .01.	29. 17.9 by .18.
15. 1.23 by .05.	30. 1.43 by .33.

Multiply .0065 by 100.

We do this by moving the decimal point two places to the right. The product is .65.

Divide .65 by 100.

Obviously, the quotient is .0065.

.0065 is obtained from .65 by moving the decimal point in .65 two places to the left.

Hence, we divide a number by 100 by moving the decimal point of the number two places to the left.

Likewise, we divide a number by 1,000 by moving the decimal point of the number three places to the left. Thus, we divide 7.82 by 1,000 by moving the decimal point three places to the left. The quotient is .00782.

**EXERCISE 49 (Oral and Written)**

Divide by 10:

1. 27; 345; 7,290; 11.1824; 9.73; 12.01; .25; .39; .89; .007.

Divide by 100:

2. 793; 8,240; 9,974; 728.3; 29.7; 26.4; 5.27; 6.21; 7.302; .914.

Divide by 1,000:

3. 7,411; 8,213; 998; 712; 604; 68.2; 55.9; 1.73; 5.21; 4.32; 6.183; 5.213; .941; .75; .87; .92; .091; .056; .08; .072.

**MEASUREMENTS**

The **area** of a surface is the number of units of surface which the surface contains.

The units of surface commonly used are the **square inch**, the **square foot**, the **square yard**, the **acre**, and the **square mile**.

The **square inch** is the amount of surface in a square whose side is one inch.

The **square foot** is the amount of surface in a square whose side is one foot.

The **square yard** is the amount of surface in a square whose side is one yard.

The acre contains 4,840 square yards.

The **square mile** is the amount of surface in a square whose side is one mile. It contains 640 acres.

#### EXERCISE 50 (Oral)

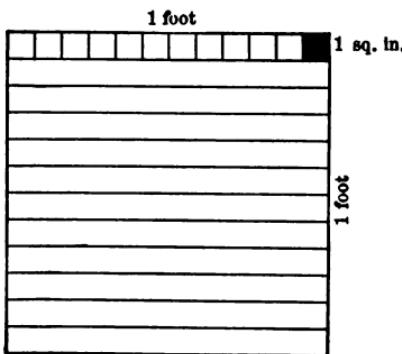


FIG. 1.

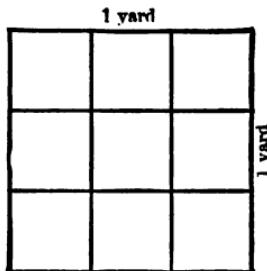
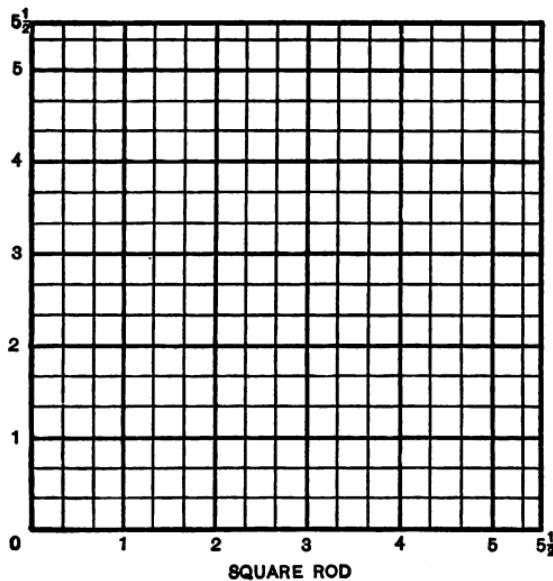


FIG. 2.

1. From Figure 1, find how many square inches are in 1 square foot.
2. Each side of the large square in Figure 2 represents 1 yard. Each small square represents 1 square foot. How many square feet are in 1 square yard?
3. How many square inches are in 2 square feet? in 3 square feet?
4. How many square feet are in 2 square yards? In 4 square yards? In 8 square yards? In 11 square yards?

**EXERCISE 51**

1. How many sq. yd. are in a rectangle 1 yd. long and  $\frac{1}{2}$  yd. wide?
2. How many sq. yd. are in a square, each side of which is  $\frac{1}{2}$  yd.?
3. How many sq. yd. are in a rectangle 5 yd. long and  $\frac{1}{2}$  yd. wide?
4. How many sq. yd. are in a square, each of whose sides is 5 yd.?
5. The area of a square  $5\frac{1}{2}$  yd. on a side is called a sq. rd. How many sq. yd. make 1 sq. rd.?



## LINEAR MEASURE

12 inches (in.)	= 1 foot (ft.)
3 feet	= 1 yard (yd.)
5½ yards	= 1 rod (rd.)
320 rods	= 1 mile (mi.)

## EXERCISE 52 (Oral and Written)

1. How many yards are in 1 rod? How many yards are in 2 rods?
2. How many yards are in 3 rods? In 4 rods? In 5 rods? In 5½ rods?
3. How many yards are in 15 rods? In 90 rods? In 320 rods?
4. How many yards are in 1 mile? In 2 miles? In 3 miles? In 5 miles?
5. How many yards are in 9 miles? In 12 miles? In 15 miles? In 20 miles?
6. How many feet are in 1 rod? In 2 rods? In 7 rods? In 9 rods? In 11 rods?
7. How many feet are in 15 rods? In 20 rods? In 30 rods? In 320 rods?
8. How many feet are in 1 mile? In 2 miles? In 5 miles? In 12 miles?
9. How many yards are in 111 feet? How many yards are in 5,280 feet?

10. How many rods are in 11 yards? How many rods are in 55 yards?

11. How many rods are in  $71\frac{1}{2}$  yards? In  $137\frac{1}{2}$  yards?

12. How many miles are in 640 rods? How many miles are in 1,600 rods?

13. How many miles are in 2,560 rods?

14. Mt. Douglas, Montana, is 11,300 feet high. How many miles high is Mt. Douglas?

15. The greatest altitude in Texas is Chinati Peak. It is 7,730 feet high. How many miles high is the highest point in Texas?

16. The highest mountain in Colorado is Mt. Massive. It is 14,424 feet high. How many miles high is Mt. Massive?

### SQUARE MEASURE

144 square inches (sq. in.)	= 1 square foot (sq. ft.)
9 square feet	= 1 square yard (sq. yd.)
$30\frac{1}{4}$ square yards	= 1 square rod (sq. rd.)
160 square rods	= 1 acre (A.)
640 acres	= 1 square mile (sq. mi.)

### EXERCISE 53 (Oral and Written)

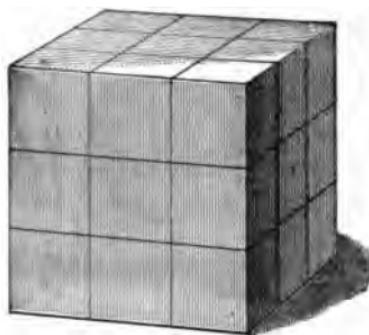
1. How many square yards are in 1 square rod? In 2 sq. rd.? In 3 sq. rd.?

2. How many square yards are in 4 sq. rd.? In 7 sq. rd.? In 11 sq. rd.? In 15 sq. rd.? In 20 sq. rd.? In 60 sq. rd.? In 100 sq. rd.? In 160 sq. rd.?
3. How many square yards are in 1 A.? In 3 A.? In 5 A.? In 7 A.? In 9 A.?
4. How many square rods are in 5 A.? In 7 A.? In 9 A.? In 15 A.? In 25 A.? In 32 A.? In 57 A.? In 100 A.? In 400 A.? In 640 A.?
5. A farm contains 96,000 sq. rd. How many acres are in the farm?
6. A field contains 5,440 sq. rd. How many acres are in the field?
7. How many acres are in a rectangular lot 50 rd. long and 40 rd. wide?
8. How many acres are in a farm 320 rd. long and 320 rd. wide?
9. How many sq. rd. are in  $\frac{3}{4}$  of an acre? In  $\frac{7}{8}$  of an acre? In  $\frac{21}{32}$  A.? In .9 A.? In .7 A.? In .375 A.?
10. How many acres are in .3125 sq. mi.? In .5625 sq. mi.?
11. How many sq. yd. are in .75 A.? In .625 A.? In .875 A.?
12. How many sq. in. are in .0625 sq. ft.? In .1875 sq. ft.?

## CUBIC MEASURE



CUBIC FOOT.

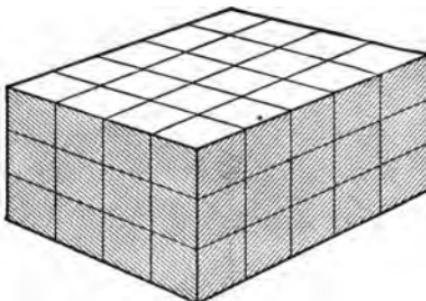


CUBIC YARD.

1,728 cubic inches (cu. in.) = 1 cubic foot (cu. ft.)  
 27 cubic feet = 1 cubic yard (cu. yd.)  
 128 cubic feet = 1 cord of wood

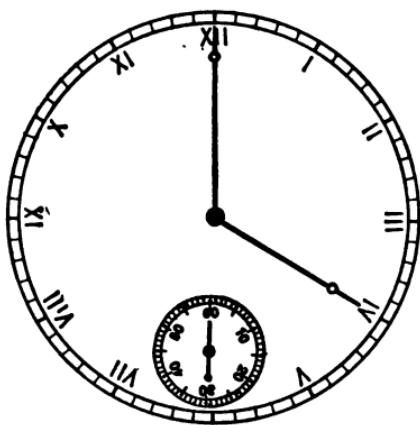
## EXERCISE 54 (Oral and Written)

1. How many cubic feet are in  $\frac{2}{3}$  of a cubic yard?
2. How many cubic feet and cubic inches are in  $\frac{1}{2}$  of a cubic yard?
3. How many cubic feet are in a box 3 ft. long, 2 ft. wide, and 1 ft. deep?
4. A gallon contains 231 cubic inches. How many gallons will it take to fill a cubical box each of whose sides is 1 foot?
5. A bushel measure contains 2,150.42 cubic inches. How many cu. ft. are in a bushel?
6. Thirty-two quarts make a bushel. How many cubic inches are in one of these quarts?
7. Four quarts make a gallon. How many cubic inches are in one of these quarts?



8. How many cu. yd. are in a room 5 yd. long, 4 yd. wide, and 3 yd. high?
9. How many cu. ft. are in the same room? Give a rule for finding the number of cubic units in a rectangular solid.
10. A box is 17 in. by 12 in., and 9 in. deep. How many cu. in. are in the box?
11. A pool of water is 25 ft. long, 18 ft. wide, and 4 ft. deep. How many cu. ft. of water are in the pool?
12. A wagon bed is 7 ft. long, 4 ft. wide, and 3 ft. deep. How many cu. ft. does it contain?
13. How many cu. ft. of sand will it take to fill a lot 120 ft. by 40 ft. to a depth of 2 ft.?
14. How many cu. yd. of sand are needed to fill a lot 108 ft. by 39 ft. to the depth of  $1\frac{1}{2}$  ft.?
15. Find the cost of filling the above lot at 60¢ per cu. yd.

## TIME MEASURE



60 seconds (sec.)	= 1 minute (min.)
60 minutes	= 1 hour (hr.)
24 hours	= 1 day (da.)
7 days	= 1 week (wk.)
4 weeks	= 1 lunar month
30 days	= 1 commercial month
12 months (mo.)	= 1 year (yr.)
365 days	= 1 common year
366 days	= 1 leap year

The names of the months and the number of days in each are as follows:

January	.	.	31 days	July	.	.	31 days
February	.	.	28 days	August	.	.	31 days
March	.	.	31 days	September	.	.	30 days
April	.	.	30 days	October	.	.	31 days
May	.	.	31 days	November	.	.	30 days
June	.	.	30 days	December	.	.	31 days

February has 29 days every leap year.

Omitting centennial years, if the number denoting the year is exactly divisible by 4, that year is a leap year.

Centennial years exactly divisible by 400 are leap years.

**EXERCISE 55 (Written)**

1. How many days are in the first three months of the present year?
2. How many days are in the last three months of the present year?
3. How many days are there from the first of March to the fifth of May?
4. How many days were from the first of February to the first of April in the year 1896?
5. How many minutes are in 1 hour? In 10 hours? In 1 day? In 2 days? In 5 days?
6. How many minutes are in the month of January? In the month of July?
7. How many minutes are in the month of September? Of December?
8. The school day begins at 9 A.M. and ends at 3 P.M. How many minutes are in a school day? If the school day ends at 2.30 o'clock, how many minutes are in the school day?
9. How many minutes are there from 9.30 o'clock until noon? How many minutes are in  $\frac{1}{2}$  an hour?

How many minutes are in  $1\frac{1}{2}$  hours? How many minutes are in  $3\frac{3}{4}$  hours?

10. How many hours and minutes are in 200 minutes? In 330 minutes? In 500 minutes? In 1,000 minutes? In 10,000 minutes?
11. How many minutes are in 1 common year?
12. How many hours are in a leap year?
13. How many hours are in a commercial month?
14. How many hours are there from Christmas Day to the first of March?
15. How many hours are there from 9 A.M. Sunday to 4 P.M. Tuesday following?
16. How many weeks are in one year? How many weeks are in 4 consecutive years?
17. A man lived 76 years? How many months did he live?
18. How many months are in  $58\frac{1}{2}$  years? In  $5\frac{3}{4}$  years?
19. How many years and months are in 400 months? In 905 months?
20. How many days are in  $\frac{1}{2}$  of a common year? In  $\frac{1}{4}$  of a common year?
21. The average length of a solar year is  $365\frac{1}{4}$  days nearly. How many hours are in a solar year? In  $\frac{1}{4}$  of a solar year? In  $\frac{3}{8}$  of a solar year?
22. How many hours are there from midnight October 31 to midnight January 31 following?

## AVOIRDUPOIS WEIGHT

16 ounces (oz.) = 1 pound (lb.)  
 100 pounds = 1 hundredweight (cwt.)  
 2,000 pounds = 1 ton (T.)

## EXERCISE 56 (Oral and Written)

1. How many ounces are in 2 lb. ? In 5 lb. ?
2. How many pounds are in 108 oz. ? In 256 oz. ?
3. How many ounces are in  $\frac{1}{2}$  lb. ? In  $\frac{3}{4}$  lb. ? In  $\frac{7}{8}$  lb. ? In  $\frac{7}{10}$  lb. ?
4. How many ounces are in .375 lb. ? In 1.35 lb. ? In 1.65 lb. ?
5. What part of a pound is 9 oz. ? What part of a pound is 10 oz. ?
6. What part of a pound is 12 oz. ?  $2\frac{2}{3}$  oz. ?  $3\frac{1}{2}$  oz. ?  $9\frac{3}{8}$  oz. ?
7. How many pounds are in  $\frac{1}{2}$  cwt. ? In  $\frac{3}{4}$  cwt. ? In  $\frac{7}{8}$  cwt. ?
8. What part of a ton is 1 cwt. ? 5 cwt. ? 7 cwt. ? 9 cwt. ? 12 cwt. ?
9. What decimal of a ton is 6 cwt. ? 8 cwt. ? 14 cwt. ? 16 cwt. ?
10. Find the price of  $1\frac{1}{2}$  T. of coal at \$6.50 a ton.
11. A bushel of wheat weighs 60 lb. How many bushels of wheat will weigh 1 T. ? 3 T. ?  $4\frac{1}{2}$  T. ? 4.2 T. ? 6.3 T. ?  $7\frac{1}{2}$  T. ?
12. A bushel of oats weighs 32 lb. How many bushels of oats will weigh 1 T. ? 3 T. ? 14 T. ? 24 T. ? 32 T. ? 48 T. ?

13. Find the price of  $5\frac{1}{2}$  T. of hay at \$10.50 a ton.
14. Find the price of a bale of hay weighing 100 lb. when hay sells for \$12 a ton.
15. Find the cost of 3 cwt. of coal at \$7.50 a ton.
16. Find the cost of a 25-lb. sack of flour at \$3.20 a hundredweight.

### UNITED STATES MONEY

10 mills (m.) = 1 cent (¢)

10 cents = 1 dime

10 dimes = 1 dollar (\$)

10 dollars = 1 eagle

Write:

Two dollars, fifty cents, and five mills.

Six dollars, twenty-eight cents, and four mills.

Nine dollars, three cents, and five mills.

Ten dollars, ten cents, and two mills.

Read:

\$5.234; \$6.901; \$15.012; \$87.112; \$96.003.

How many mills are in \$1? in \$2? in \$3? in \$5? in \$5.42? in \$18.08?

How do you change dollars to mills?

How do you change mills to dollars?

What part of a dollar is a mill?

What do you call a figure written in the third place after the decimal point?

What is the meaning of the word mill?

## EXERCISE 57

1. If the tax rate is  $2\frac{1}{2}\%$  on the dollar, how much will a man pay on property valued at \$5,280? \$3,750? \$6,850?
2. The tax rate is  $2\frac{1}{2}\%$  on the dollar. How much tax should a man pay on property valued at \$5,760? \$6,840? \$8,480?
3. The school tax in a certain city is 4 mills on the dollar. How much school tax does a man pay whose property is valued at \$6,000? \$7,250? \$8,925?
4. Find the tax paid on property valued at \$7,200, if the tax rate is 20 mills on the dollar.
5. The tax rate in a certain city is  $3\frac{1}{3}\%$  on the dollar. How much tax will a man pay on property valued at \$8,400? \$3,360? \$2,490?
6. A bale of cotton which weighs 480 lb. is sold at  $9\frac{1}{2}\%$  per lb. How much does the bale bring?
7. A man plants 20 acres in cotton. The yield is  $\frac{3}{4}$  of a bale per acre. How much is the crop worth at  $9\frac{1}{4}\%$  per lb., the average weight of a bale being 510 lb.?
8. A farmer plants 30 acres in wheat, which yields 18 bu. per acre. How much is the crop worth at  $76\frac{1}{4}\%$  per bu.?
9. A 20-acre field yields 35 bu. of oats per acre. What is the crop worth at  $37\frac{3}{4}\%$  per bu.?

## COMPOUND QUANTITIES

Quantities expressed in terms of units of different denominations are called **compound quantities**. For example, 5 yd., 2 ft., 7 in. is a compound quantity. 2 hr., 25 min. is a compound quantity.

## ADDITION OF COMPOUND QUANTITIES

1. Find the sum of 5 yd., 2 ft., 3 in.; 6 yd., 1 ft., 3 in.; 2 yd., 2 ft., 11 in.

YD.	FT.	IN.	Adding the column of inches, we have $(11 + 3 + 3)$ in. = 17 in. = 1 ft., 5 in. Write 5 in. and carry 1.
5	2	3	$(1 + 2 + 1 + 2)$ ft. = 6 ft. = 2 yd.
6	1	3	
2	2	11	Write 0 in the column for feet and carry 2.
15	0	5	

$$(2 + 2 + 6 + 5) \text{ yd.} = 15 \text{ yd. Write } 15 \text{ yd.}$$

## EXERCISE 58

1. Add:

FT.	IN.
7	4
9	8
6	11

2. Add:

FT.	IN.
5	5
7	7
11	10

3. Add:

FT.	IN.
6	2
9	9
5	8

4. Add:

HR.	MIN.
2	17
7	18
9	55

5. Add:

HR.	MIN.
9	28
8	43
6	24

6. Add:

HR.	MIN.
15	12
19	39
14	48

7. Add :

LB.	OZ.
9	11
7	9
8	15

8. Add :

LB.	OZ.
6	13
5	12
2	14

9. Add :

LB.	OZ.
23	5
29	6
37	11

10. Add :

GAL.	QT.	PT.
5	3	1
6	2	1
9	1	0

11. Add :

GAL.	QT.	PT.
11	2	1
8	3	1
7	3	1

12. Add :

BU.	PK.	QT.
5	3	5
2	2	4
9	1	7

13. Add :

BU.	PK.	QT.
8	2	6
7	3	7
3	2	5

14. A cow averages during the month of January 3 gal. 3 qt. and 1 pt. of milk a day. How much is the milk worth at 4¢ a pint? How much is the milk worth during the month of January?

15. A sack contains 2 bu. 2 pk. and 5 qt. of pecans. What is the sack worth at 7¢ per qt.?

16. How far will a freight train run in 2 hr. and 15 min. at 18 mi. an hr.?

17. Find how far a passenger train will run in 5 hr. and 45 min. at the rate of 36 mi. per hr.

18. When a yard of ribbon sells for 15¢, how much should be paid for a ribbon 5 yd. 2 ft. 3 in. long?

## SUBTRACTION

## EXERCISE 59

1. Subtract 19 bu., 3 pk., 4 qt. from 25 bu., 1 pk., 2 qt.

BU.	PK.	QT.
25	1	2
19	3	4
5	1	6

As 4 qt. cannot be taken from 2 qt., we take it from 1 pk. and 2 qt.

1 pk. and 2 qt. = 10 qt. 4 qt. from 10 qt. leaves 6 qt.

Write 6, carry 1.

1 pk. and 3 pk. are 4 pk. 4 pk. from 1 bu. and 1 pk. leaves 1 pk. Write 1 pk. and carry 1. 1 bu. and 19 bu. are 20 bu. 20 bu. and 5 bu. are 25 bu. The answer is 5 bu., 1 pk., and 6 qt.

Subtract:

2. 9 bu., 2 pk., 7 qt. from 20 bu., 3 pk., 5 qt.
3. 15 bu., 3 pk., 5 qt. from 20 bu., 3 pk., 1 qt.
4. 27 bu., 1 pk., 4 qt. from 33 bu., 0 pk., 2 qt.
5. 4 gal., 2 qt., 1 pt. from 10 gal.
6. 7 gal., 3 qt., 1 pt. from 15 gal., 1 qt.
7. 5 yd., 1 ft., 7 in. from 11 yd., 1 ft., 2 in.
8. 9 yd., 2 ft., 3 in. from 17 yd.
9. 16 yd., 2 ft., 4 in. from 24 yd., 2 ft., 1 in.
10. 12 da., 7 hr., 17 min. from 29 da., 2 hr., 28 min.
11. 11 da., 3 hr., 30 min. from 17 da., 2 hr., 20 min.
12. 37 lb., 11 oz. from 50 lb., 9 oz.
13. 18 lb., 12 oz. from 28 lb., 10 oz.
14. 34 lb., 4 oz. from 45 lb., 8 oz.

## MULTIPLICATION

## EXERCISE 60

1. If one side of a square is 17 ft., 5 in., find the length of its four sides.

Four times 5 in. are 20 in., which equals 1 ft., 8 in. Write 8 in. and carry 1 ft.

$$\begin{array}{r}
 \text{ft.} \quad \text{in.} \\
 17 \quad \quad 5 \\
 \hline
 69 \quad 8
 \end{array}
 \quad
 \begin{array}{l}
 4 \quad \text{4 times 17 ft. are 68 ft.} \\
 \hline
 1 \quad \text{68 ft. and} \\
 \quad \quad 1 \text{ ft. are 69 ft.}
 \end{array}$$

The answer is 69 ft., 8 in.

Multiply :

2. 11 ft., 7 in. by 12; 15 ft., 3 in. by 6.
3. 13 ft., 5 in. by 7; 9 ft., 11 in. by 11.
4. 11 gal., 2 qt., 1 pt. by 6; 13 gal., 3 qt., 1 pt. by 8.
5. 9 gal., 1 qt., 1 pt. by 9; 3 gal., 3 qt., 1 pt. by 11.
6. 24 bu., 2 pk., 6 qt. by 5; 29 bu., 3 pk., 3 qt. by 6.
7. 27 bu., 1 pk., 7 qt. by 10; 18 bu., 3 pk., 2 qt. by 9.
8. 4 wk., 3 da., 15 hr. by 6; 7 wk., 6 da., 18 hr. by 7.
9. 17 lb., 7 oz. by 7; 25 lb., 11 oz. by 12.
10. A lot is 42 ft., 10 in. wide, and there are 7 lots in the south half of a block. How long is the block?

## DIVISION

## EXERCISE 61

1. The total surface of a cube is 37 sq. ft., 72 sq. in. Find the area of one of its faces.

A cube has six faces. Hence the area of one face is  $\frac{1}{6}$  of the total surface of the cube.  $\frac{1}{6}$  of 37 sq. ft. is 6 sq. ft., with 1 sq. ft. left over. 1 sq. ft. and 72 sq. in. equals 216 sq. in.  $\frac{1}{6}$  of 216 sq. in. equals 36 sq. in. The answer is 6 sq. ft., 36 sq. in.

Divide :

2. 10 gal., 2 qt., 1 pt. by 4; 33 bu., 3 pk. by 5.
3. 170 yd., 3 ft., 2 in. by 18; 9 yd., 2 ft., 8 in. by 4.
4. 25 hr., 15 min. by 15; 16 hr., 48 min. by 6.
5. 19 hr., 18 min. by 12; 18 lb., 12 oz. by 8.
6. 36 lb., 4 oz. by 10; 24 sq. ft., 96 sq. in. by 16.
7. The perimeter of a hexagon is 92 ft. 6 in. Find the length of one of its sides.
8. How many boards each 12 ft. long will extend once around a lot 96 ft. by 30 ft.?
9. How many tiles 4 in. by 4 in. will pave a hall 18 ft. by 10 ft.?
10. How many square tiles 6 in. on a side will it take to pave a court 40 ft. by 25 ft.?
11. How many sq. in. are in a rectangle 4 ft., 6 in. long and 2 ft., 4 in. wide? How many sq. ft., are in its area?

## PERCENTAGE

A farmer gives his son 1 sheep out of every 3 in a flock. If the flock consists of 1,200 sheep, how many sheep does the son get?

If the father gives him 1 sheep out of every 4 in the flock, how many does he get? If he gives him 1 sheep out of every 5 in the flock, how many does he get? If he gives him 1 sheep out of every 10 in the flock, how many does he get? If he gives him 1 sheep out of every 100 sheep in the flock, how many does he get? If he gives him 2 sheep out of every 100 in the flock, how many does he get? If he gives him 3 out of every 100, how many does he get? If he gives him 6 out of every 100, how many does he get?

1 in a hundred is commonly called 1 per cent.

2 in a hundred is commonly called 2 per cent.

3 in a hundred is commonly called 3 per cent.

6 in a hundred is commonly called 6 per cent.

1 per cent is often written 1%.

2 per cent is often written 2%.

3 per cent is often written 3%.

4 per cent is often written 4%.

5 per cent is often written 5%.

6 per cent is often written 6%.

## EXERCISE 63 (Written)

1. Find 1% of \$ 2,750.

$$1\% \text{ of } \$2,750 = \frac{\$2,750}{100} = \$27.50.$$

2. Find 3% of \$2,750.

$$\frac{\$2,750}{100} \times 3 = \$27.50 \times 3 = \$82.50.$$

Find :

3. 2% of \$1,250; 3% of \$1,250; 4% of \$1,250; 5% of \$1,250; 6% of \$1,250.

4. 3% of \$1,800; 4% of \$1,800; 5% of \$1,800; 6% of \$1,800; 7% of \$1,800.

5. 3% of \$2,500; 4% of \$2,500; 5% of \$2,500; 6% of \$2,500; 8% of \$2,500.

6. 4% of \$1,750; 5% of \$1,750; 6% of \$1,750; 7% of \$1,750; 8% of \$1,750.

7. 5% of \$2,150; 6% of \$2,150; 7% of \$2,150; 8% of \$2,150; 9% of \$2,150.

8. 6% of \$775; 7% of \$775; 8% of \$775; 9% of \$775; 10% of \$775.

9. 7% of \$640; 8% of \$640; 9% of \$640; 10% of \$640; 11% of \$640.

10. 8% of \$780; 9% of \$780; 10% of \$780; 11% of \$780; 12% of \$780.

11. A man invests \$2,400 in business and gains 20% on his investment. Find his gain.

12. A farmer gives his eldest son 25% of a farm containing 648 acres. How many acres does he give his son? What part of the farm does the son get?

13. A man dying leaves 25% of his estate to his widow, 15% to each of his three sons, and the remainder to his daughter. The estate was valued

at \$9,500. Find the share of the widow, of a son, and of the daughter.

14. A lawyer collects a debt amounting to \$550, and charges 6% for collecting it. Find the lawyer's fee for collecting the debt.

15. A real estate agent sold 540 acres of land for \$25 an acre, and charged 4% for selling it. How many dollars did he charge for selling the land?

16. The population of a certain city is 29,500. 12 per cent of the population can neither read nor write. Find the number in that city who can neither read nor write.

### INTEREST

Money paid for the use of money is called interest.

Interest is reckoned as a rate per cent *per annum*. *Per annum* means "by the year."

### EXERCISE 63 (Written)

Find the interest on :

1. \$500 for 1 year at 5%. 5. \$230 for 1 year at 8%.
2. \$750 for 1 year at 4%. 6. \$560 for 1 year at 7%.
3. \$1,200 for 1 year at 6%. 7. \$385 for 1 year at 5%.
4. \$850 for 1 year at 7%. 8. \$445 for 1 year at 6%.
9. Find the interest on \$650 for 7 months at 5%.

$$\frac{\$650}{100} \times 5 = \text{interest for 1 year.}$$

$$\frac{\$650}{100} \times 5 \times \frac{7}{12} = \text{interest for 7 months.}$$

$$\$6.50 \times 5 \times \frac{7}{12} = \$18.958, \text{ or } \$18.96 \text{ nearly.}$$

The sum of money on which interest is reckoned is called the **principal**.

The sum of the principal and the interest is called the **amount**.

Find the interest on :

1. \$240 for 3 months at 6%.
2. \$500 for 3 months at 8%.
3. \$672 for 4 months at 5%.
4. \$945 for 4 months at 6%.
5. \$387 for 5 months at 9%.
6. \$250 for 7 months at 8%.
7. Find the amount of \$750 for  $1\frac{1}{2}$  years at 6%.
8. Find the amount of \$800 for  $1\frac{1}{4}$  years at 7%.
9. Find the amount of \$690 for 1 year 4 months at 7%.
10. Find the amount of \$840 for 7 months at 7%.

## TABLES

LIQUID MEASURE	DRY MEASURE
4 gills (gi.) = 1 pint (pt.)	2 pints (pt.) = 1 quart (qt.)
2 pints = 1 quart (qt.)	8 quarts = 1 peck (pk.)
4 quarts = 1 gallon (gal.)	4 pecks = 1 bushel (bu.)
31½ gallons = 1 barrel (bbl.)	
2 barrels = 1 hogshead (hhd.)	
NUMERICAL	LINEAR, OR LONG MEASURE
12 articles = 1 dozen (doz.)	12 inches (in.) = 1 foot (ft.)
12 dozen = 1 gross	3 feet = 1 yard (yd.)
12 gross = 1 great gross	5½ yards = 1 rod (rd.)
20 articles = 1 score	320 rods = 1 mile (mi.)
PAPER MEASURE	UNITED STATES MONEY
24 sheets = 1 quire	10 mills (m.) = 1 cent (¢)
20 quires = 1 ream	10 cents = 1 dime
2 reams = 1 bundle	10 dimes = 1 dollar (\$)
5 bundles = 1 bale	10 dollars = 1 eagle
SQUARE MEASURE	
144 square inches (sq. in.) = 1 square foot (sq. ft.)	
9 square feet	= 1 square yard (sq. yd.)
30½ square yards	= 1 square rod (sq. rd.)
160 square rods	= 1 acre (A.)
640 acres	= 1 square mile (sq. mi.)
AVOIRDUPOIS WEIGHT	
16 ounces (oz.) = 1 pound (lb.)	
100 pounds	= 1 hundredweight (cwt.)
20 hundredweight	= 1 ton (T.)
2,240 pounds	= 1 long ton

## CUBIC MEASURE

1,728 cubic inches (cu. in.)	=1 cubic foot (cu. ft.)
27 cubic feet	=1 cubic yard (cu. yd.)
128 cubic feet	=1 cord of wood

## TIME MEASURE

60 seconds (sec.)	=1 minute (min.)
60 minutes	=1 hour (hr.)
24 hours	=1 day (da.)
7 days	=1 week (wk.)
4 weeks	=1 lunar month
30 days	=1 commercial month
12 months (mo.)	=1 year (yr.)
365 days	=1 common year
366 days	=1 leap year

## ROMAN NOTATION

1 ..	I	10 ..	X	100 ..	C	1,000 ..	<b>M</b>
2 ..	II	20 ..	XX	200 ..	CC	2,000 ..	<b>MM</b>
3 ..	III	30 ..	XXX	300 ..	CCC	3,000 ..	<b>MMM</b>
4 ..	IV	40 ..	XL	400 ..	CD	4,000 ..	<b>IV</b>
5 ..	V	50 ..	L	500 ..	D	5,000 ..	<b>V</b>
6 ..	VI	60 ..	LX	600 ..	DC	6,000 ..	<b>VI</b>
7 ..	VII	70 ..	LXX	700 ..	DCC	7,000 ..	<b>VII</b>
8 ..	VIII	80 ..	LXXX	800 ..	DCCC	8,000 ..	<b>VIII</b>
9 ..	IX	90 ..	XC	900 ..	CM	9,000 ..	<b>IX</b>

## ANSWERS

### PART II

#### ADDITION

**Exercise 5.**—1. 868. 2. 864. 3. 1,421. 4. 1,063. 5. 970.  
6. 1,058. 7. 1,982 lb. 8. 1,806 yd. 9. 1,439 bu. 10. 2,051 sheep.  
11. 1,868 ft. 12. 1,618 mi. 13. \$768. 14. 1,149 bbls. 15. 1,063.  
16. 1,813. 17. 982. 18. 1,682. 19. 1,589. 20. 1,722. 21. 1,570.  
22. 2,227. 23. 1,643. 24. 1,543. 25. 1,672. 26. 2,021. 27. 1,429 lb.  
28. 497 A. 29. 913 bbls.

**Exercise 6.**—1. 2,149. 2. 2,695. 3. 1,921. 4. 2,218. 5. 1,989.  
6. 1,945. 7. 2,278. 8. 1,837. 9. 1,751. 10. 2,599. 11. 2,509.  
12. 2,633. 13. 2,558. 14. 2,865. 15. 2,795. 16. 2,900. 17. 2,467.  
18. 3,003. 19. 2,640. 20. 2,473. 21. 2,758. 22. 2,066. 23. 2,456.  
24. 2,532. 25. 1,194 mi. 26. \$1,169. 27. 1,345 bales. 28. 2,164 cattle.

**Exercise 7.**—1. 1,166. 2. 2,032. 3. 2,021. 4. 2,382. 5. 2,306.  
6. 2,132. 7. 1,339. 8. 2,764. 9. 1,653. 10. 1,862. 11. 1,066. 12. 1,034.  
13. 1,838. 14. 1,655. 15. 1,681. 16. 1,420. 17. 1,685. 18. 1,801.  
19. 2,198. 20. 3,048. 21. 1,457. 22. 2,055. 23. 600 books. 24. 1,794 T.

**Exercise 8.**—44. 388 yd., 194 yd. 45. 1,224 ft., 612 ft. 46. 1,906 ft.  
47. 1,214 yd. 48. 502 ft. 49. 2,780 ft. 50. 1,760 yd. 51. 3,400 yd.  
52. 1,814 yd. 53. 3,708 yd.

**Exercise 11.**—1. 33,003. 2. 35,240. 3. 27,148. 4. 39,300. 5. 37,467.  
6. 37,260. 7. 26,159. 8. 27,208. 9. 19,233. 10. 37,956. 11. 29,277.  
12. 32,818. 13. 48,737. 14. 47,597. 15. 51,381. 16. 37,682. 17. 43,951.  
18. 47,628. 19. 561,165. 20. 564,092. 21. 613,358. 22. 616,238.  
23. 489,776. 24. 469,848. 25. 10,704 yd. 26. 26,398 lb. 27. 25,854 bu.

**Exercise 12.**—1. 28,356. 2. 47,442. 3. 43,939. 4. 31,392. 5. 45,375.  
6. 23,354. 7. 24,491. 8. 39,527. 9. 41,876. 10. 30,342. 11. 37,983.  
12. 33,188. 13. 38,833. 14. 10,236 A. 15. \$7,458. 16. 4,761 children.  
17. 38,187.

#### SUBTRACTION

**Exercise 14.**—1. 14. 2. 29. 3. 28. 4. 37. 5. 34. 6. 39. 7. 29.  
8. 81. 9. 44. 10. 18. 11. 108. 12. 104. 13. 198. 14. 309. 15. 695.  
16. 99. 17. 154. 18. 397. 19. 396. 20. 757. 21. 2,999. 22. 2,694.  
23. 2,203. 24. 7,483. 25. 4,089. 26. 2,997. 27. 2,903. 28. 5,809.

29. 6,907. 30. 3,898. 31. 4,809. 32. 199. 33. 6,897. 34. 4,808.  
 35. 28,799. 36. 17,798. 37. 30,095. 38. 12,899. 39. 10,989.  
 40. 40,104. 41. 99,703. 42. 4,571. 43. 10,782. 44. 26,620. 45. 798.  
 46. 318 ft. 47. 4,395 sq. mi. 48. 10,490 sq. mi. 49. 216,610 sq. mi.

**Exercise 15.**—1. 1,576. 2. 6,089. 3. 2,371. 4. 2,337. 5. 2,239.  
 6. 2,386. 7. 1,015. 8. 1,397. 9. 1,995. 10. 309. 11. 4,311. 12. 1,191.  
 13. 1,989. 14. 3,889. 15. 1,573. 16. 4,617. 17. 2,435. 18. 5,979.  
 19. 987. 20. 4,956. 21. \$377. 22. \$3,930. 23. \$73. 24. \$778.  
 25. \$37. 26. \$77. 27. 615,408.

### MULTIPLICATION

**Exercise 18.**—1. 322. 2. 400. 3. 672. 4. 828. 5. 1,008. 6. 1,175.  
 7. 1,450. 8. 2,048. 9. 1,800. 10. 3,456. 11. 3,675. 12. 2,250.  
 13. 5,876. 14. 13,696. 15. 16,920. 16. 10,952. 17. 20,400. 18. 27,848.  
 19. 46,008. 20. 77,616. 21. 5,184. 22. 9,216. 23. 7,056. 24. 40,368.  
 25. 84,405. 26. 110,325. 27. 110,450. 28. 36,125. 29. 45,414.  
 30. 236,532.

**Exercise 20.**—1. 112,896. 2. 136,161. 3. 234,256. 4. 294,525.  
 5. 488,601. 6. 627,264. 7. 746,496. 8. 3,034,656. 9. 228,484.  
 10. 968,256. 11. 799,236. 12. 633,616. 13. 760,384. 14. 1,386,875.  
 15. 992,016. 16. 313,632. 17. 332,592. 18. 187,264. 19. 5,616,900.  
 20. 2,440,360. 21. 661,500. 22. 1,414,400. 23. \$315, \$1035. 24. \$10,725.  
 25. \$15,260. 26. 180 in. 27. 63,380 in. 190,080 in. 28. 132 mi., 1584 mi.  
 29. 3200 A., 7680 A. 30. 800,000 A. 31. 44,800 A. 32. \$3,876.  
 33. \$12,348.

### DIVISION

**Exercise 25.**—1. 13. 2. 14. 3. 24. 4. 25. 5. 15. 6. 21. 7. 21.  
 8. 15. 9. 32. 10. 34. 11. 35. 12. 32. 13. 34. 14. 44. 15. 45.  
 16. 25. 17. 24. 18. 53. 19. 52. 20. 54. 21. 37. 22. 114. 23. 117.  
 24. 126. 25. 135. 26. 138. 27. 159. 28. 165. 29. 192. 30. 268.  
 31. 75 A. 32. 34 hr. 33. 33 cattle. 34. 45 mowers. 35. 26 wagons.  
 36. 85 buggies. 37. 36 horses. 38. \$92. 39. 48'yd. 40. 96 oranges.  
 41. \$152. 42. 36 T. 43. 136 poles. 44. 85 stoves. 45. \$96. 46. \$84.  
 47. \$45. 48. \$23. 49. \$16. 50. \$16.

**Exercise 26.**—1. 108. 2. 205. 3. 104. 4. 106. 5. 224. 6. 305.  
 7. 504. 8. 136. 9. 204. 10. 292. 11. 1,050. 12. 201. 13. 204.  
 14. 216. 15. 309. 16. 406. 17. 204. 18. 306. 19. 408. 20. 509.  
 21. 648. 22. 711. 23. 976. 24. 1,325. 25. 1,475. 26. 1,825. 27. 1,536.  
 28. 1,188. 29. 796. 30. 1,278. 31. 1,404. 32. 1,467. 33. 1,782.  
 34. 2,062. 35. 3,664. 36. 2,844.

## UNITED STATES MONEY

## ADDITION

**Exercise 32.**—1. \$16.58. 2. \$30.32. 3. \$40.30. 4. \$173.04.  
 5. \$4,045.08. 6. \$4,247.61. 7. \$5,307.46. 8. \$4,997.72.  
 9. \$100,939.20. 10. \$47,439.54. 11. \$38,907.85. 12. \$1,202,400.80.  
 13. \$180,272.12. 14. \$1,778,640.33. 15. \$1,215,918.10.  
 16. \$5,854,753.53. 17. \$6,471,928.70. 18. \$26,049,231.69.  
 19. \$597,340.89. 20. \$6,504,708.75.

**Exercise 33.**—1. \$1,854.98. 2. \$533,312.75. 3. \$2,019.35.  
 4. \$9,530,465. 5. \$723.90. 6. \$618.35. 7. \$1,298.71.  
 8. \$442.35. 9. \$12,864.80. 10. \$9,091.64. 11. \$39,514,644.60.  
 12. \$199,840,894.02.

## SUBTRACTION

**Exercise 34.**—1. \$2.76. 2. \$1.60. 3. \$2.88. 4. \$2.15.  
 5. 85 cents. 6. \$4.31. 7. \$3.50. 8. \$9.60. 9. \$11.15.  
 10. \$12.80. 11. \$20.31. 12. \$20.23. 13. \$33.23. 14. \$20.92.  
 15. \$56.11. 16. \$23.66. 17. \$201.42. 18. \$308.31. 19. \$222.53.  
 20. \$333.01. 21. \$400.91. 22. \$222.08. 23. \$308.91.  
 24. \$196.01. 25. \$223.37. 26. \$1,731.04. 27. \$2,844.85.  
 28. \$1,129.88. 29. \$1,299.38. 30. \$369.65. 31. \$4,011.14.  
 32. \$1,598.83. 33. \$2,472.10. 34. \$19,402.10. 35. \$13,749.99.  
 36. \$42,580.80. 37. \$50,187.58. 38. \$12,777.75. 39. \$35,922.67.  
 40. \$478,078.89. 41. \$777,659.67. 42. \$377,888.98. 43. \$256,989.08.  
 44. \$1,879,087.88. 45. \$2,789,193.81. 46. \$1,111,797.81.  
 47. \$1,788,987.80. 48. \$5. 49. \$18.50. 50. \$34.50. 51. \$75.  
 52. \$28.50. 53. 75 cents. 54. 65 cents. 55. \$12.50. 56. \$92,751.40.  
 57. \$32,132.13. 58. \$692,000,000. 59. \$257,629.50. 60. \$94,443.84.  
 61. \$48,844.75. 62. \$2,404.50. 63. \$1,144.50. 64. \$704.45.  
 65. 1,624.30. 66. 2,409.75. 67. \$264.25. 68. \$370.60.

## MULTIPLICATION

**Exercise 36.**—1. \$356.50. 2. \$403.20. 3. \$462.50. 4. \$845.60.  
 5. \$1,305.60. 6. \$1,321.20. 7. \$1,886.50. 8. \$2,698. 9. \$3,370.50.  
 10. \$4,544.64. 11. \$3,589.25. 12. \$4,125. 13. \$4,932.90. 14. \$4,691.68.  
 15. \$4,425. 16. \$5,431.68. 17. \$5,950. 18. \$6,924.96. 19. \$8,662.50.  
 20. \$12,663. 21. \$9,382.30. 22. \$11,399.52. 23. \$11,317.50.  
 24. \$11,101.44. 25. \$14,508.40. 26. \$8,626.25. 27. \$12,530.31.  
 28. \$33,392.12. 29. \$15,233.79. 30. \$46,706.60. 31. \$51,665.75.  
 32. \$45,191.05. 33. \$25,697.25. 34. \$45,539.01. 35. \$17,088.72.  
 36. \$129,648.75. 37. \$7.56. 38. \$158.56. 39. \$28.35. 40. \$21.  
 41. \$468.75. 42. \$32.40. 43. \$82.60. 44. \$245. 45. \$530.40.

46. \$937.50. 47. \$5,156.25. 48. \$3,431.25. 49. \$79. 50. \$201.25.  
 51. \$85. 52. \$202.50. 53. \$55.25. 54. \$638.40. 55. \$661.44.  
**Exercise 37.**—1. \$105.28. 2. \$67.48. 3. \$18,649.84. 4. \$132,480.  
 5. \$692,857.36. 6. \$870,266.40. 7. \$3,113.05. 8. \$5,196.80.  
 9. \$1,038,912. 10. \$20,513.70. 11. \$679.40. 12. \$378.  
 13. \$7,680. 14. \$420. 15. \$453.25. 16. \$205.92. 17. \$1,104.60.  
 18. \$51.75. 19. \$82.95, \$16.59. 20. \$60.

## DIVISION

**Exercise 40.**—1. \$2.07. 2. \$1.52. 3. \$4.68. 4. \$5.04. 5. \$5.76.  
 6. \$2.97. 7. \$3.84. 8. \$2.25. 9. \$2.44. 10. \$5.12. 11. \$2.84.  
 12. \$4.41. 13. \$3.08. 14. \$3.28. 15. \$6.88. 16. \$3.52. 17. \$5.58.  
 18. \$5.76. 19. \$9.75. 20. \$5.94. 21. \$3.56. 22. \$3.72. 23. \$6.12.  
 24. \$8.32. 25. \$8.48. 26. \$6.39. 27. \$4.52. 28. \$16.56. 29. \$17.19.  
 30. \$17.64. 31. \$11.36. 32. \$11.52. 33. \$11.64. 34. \$29.75.  
 35. \$17.46. 36. \$12.16. 37. \$12.56. 38. \$12.76. 39. \$19.35.  
 40. \$12.96. 41. \$13.10. 42. \$20.16. 43. \$13.64. 44. \$20.52.  
 45. \$13.88. 46. \$20.88. 47. \$13.96. 48. \$14.48. 49. \$22.14.  
 50. \$14.92. 51. \$16.08. 52. \$17.52. 53. \$17.88. 54. \$27.09.  
 55. \$27.27. 56. \$27.81. 57. \$18.68. 58. \$28.35. 59. \$67.06+.  
 60. \$47.75. 61. \$19.16. 62. \$19.24. 63. \$29.07. 64. \$19.52.  
 65. \$19.68. 66. \$19.92. 67. \$37.70. 68. \$59.80. 69. \$124.90.  
 70. \$2.73. 71. \$13.44. 72. \$217.50.

**Exercise 41.**—1. 4 pairs. 2. 27 lb. 3. 110 lb. 4. 36 lb.  
 5. 18 hats. 6. 56 bu. 7. 140 bu. 8. 31 suits. 9. 80 A. 10. 79 cattle.  
 11. 450 T. 12. 56. 13. 128. 14. 175. 15. 144. 16. 117. 17. 396.  
 18. 432. 19. 375. 20. 729. 21. 1,250. 22. 6,250. 23. 576. 24. 1,372.  
 25. 892. 26. 476. 27. 368. 28. 168. 29. 94. 30. 224. 31. 909.  
 32. 545. 33. 800. 34. 608. 35. 895. 36. 534. 37. 837. 38. 1,475.  
 39. 11,040. 40. 9,250. 41. 69,300. 42. 81,900. 43. 6,800. 44. 897.  
 45. 2,160. 46. 2,590. 47. 1,920. 48. 776. 49. \$1,950. 50. 3,690.  
 51. 1,329. 52. 2,535. 53. 3,035. 54. 1,000. 55. 30,001. 56. 7,000.  
 57. 20,000. 58. 1,250. 59. 3,350. 60. 3,535. 61. 7,920. 62. 4,950.  
 63. 1,932.

**Exercise 42.**—1. 13,179,626 T. 2. 10,342 T. 3. 110,892 T.  
 4. 122,834 T. 5. 848,870 T. 6. 176,185 mi. 7. 17,110. 8. 161,371 mi.,  
 170,387 mi., 171,440 mi., 166,693 mi., 163,412 mi. 9. 639 mi. 10. 31 mi.  
 11. 14 mi., nearly. 12. Between 15 and 16 mi. 13. Between 33  
 and 34 mi. 14. 36 mi., nearly. 15. \$297.50. 16. \$19. 17. \$187.50.  
 18. \$77.50. 19. \$71.25. 20. \$112.50. 21. 555. 22. 237. 23. 72.  
 24. 49. 25. \$3,562.50. 26. 250 oranges. 27. 14 sheep. 28. 16 T.  
 29. 25 bu. 30. 150 bu.

**Exercise 43.** — 2. 12,317 sq. mi. 3. 312,748 sq. mi. 4. New Hampshire, 5,763,200; Mass., 5,145,600; R.I., 673,920; Conn., 3,100,800; N.Y., 30,476,800; N.J., 4,816,000; Pa., 28,790,400; Delaware, 1,254,400; Md., 6,310,400; Va., 25,680,000; N.C., 31,091,200; S.C., 19,308,800; Ga., 37,747,200.

### PART III

#### FRACTIONS

**Exercise 20.** — 1.  $\frac{5}{6}$ . 2.  $\frac{11}{12}$ . 3.  $1\frac{1}{2}$ . 4.  $\frac{5}{8}$ . 5.  $1\frac{1}{8}$ . 6.  $\frac{2}{3}$ . 7.  $1\frac{1}{3}$ . 8.  $1\frac{1}{12}$ . 9.  $\frac{1}{2}$ . 10.  $1\frac{1}{2}$ . 11.  $1\frac{1}{2}$ . 12.  $\frac{1}{2}$ .

**Exercise 21.** — 1.  $1\frac{1}{2}$ . 2.  $1\frac{1}{2}$ . 3.  $1\frac{1}{2}$ . 4.  $\frac{5}{4}$ . 5.  $1\frac{1}{2}$ . 6.  $2\frac{1}{4}$ . 7.  $1\frac{1}{2}$ . 8.  $1\frac{1}{2}$ . 9.  $\frac{5}{4}$ . 10.  $1\frac{1}{2}$ . 11.  $1\frac{1}{2}$ . 12.  $1\frac{1}{2}$ . 13. 2. 14.  $\frac{5}{4}$ . 15.  $1\frac{1}{2}$ . 16.  $1\frac{1}{2}$ .

**Exercise 22.** — 1.  $6\frac{1}{2}$ . 2.  $7\frac{1}{2}$ . 3. 10. 4.  $11\frac{1}{2}$ . 5. 9. 6.  $14\frac{1}{2}$ . 7.  $10\frac{1}{2}$ . 8.  $13\frac{1}{2}$ . 9.  $16\frac{1}{2}$ . 10.  $12\frac{1}{2}$ . 11.  $7\frac{1}{2}$ . 12.  $11\frac{1}{2}$ . 13.  $11\frac{1}{2}$ . 14.  $12\frac{1}{2}$ .

**Exercise 23.** — 1.  $3\frac{1}{2}$  hr. 2.  $3\frac{1}{2}$  hr. 3.  $6\frac{1}{2}$  mi. 4.  $\$2\frac{1}{2}$ . 5.  $\frac{5}{4}$ . 6.  $7\frac{1}{2}$  doz. 7.  $8\frac{1}{2}$  lb. 8.  $34\frac{1}{2}$  lb. 9.  $2\frac{1}{2}$  hr. 10.  $6\frac{1}{2}$  ft. 11.  $\$6\frac{1}{10}$ . 12.  $8\frac{1}{2}$  in. 13. 8 yd.

**Exercise 24.** — 1.  $\frac{1}{2}$ . 2.  $\frac{1}{2}$ . 3.  $\frac{5}{8}$ . 4.  $\frac{1}{2}$ . 5.  $\frac{1}{2}$ . 6.  $\frac{1}{2}$ . 7.  $\frac{7}{12}$ . 8.  $\frac{1}{2}$ . 9.  $\frac{1}{2}$ . 10.  $\frac{5}{12}$ . 11.  $\frac{1}{2}$ . 12.  $\frac{1}{2}$ . 13.  $\frac{1}{2}$ . 14.  $\frac{1}{2}$ . 15.  $\frac{1}{2}$ . 16.  $\frac{1}{2}$ . 17.  $\frac{1}{2}$ . 18.  $\frac{1}{2}$ .

**Exercise 25.** — 1.  $1\frac{1}{2}$ . 2.  $1\frac{1}{2}$ . 3.  $1\frac{1}{2}$ . 4.  $1\frac{1}{2}$ . 5.  $2\frac{1}{2}$ . 6.  $1\frac{1}{2}$ . 7.  $\frac{1}{2}$ . 8.  $2\frac{1}{2}$ . 9.  $1\frac{1}{2}$ . 10.  $\frac{1}{2}$ . 11.  $2\frac{1}{2}$ . 12.  $4\frac{1}{2}$ . 13.  $4\frac{1}{2}$ . 14.  $3\frac{1}{2}$ . 15.  $4\frac{1}{2}$ . 16.  $4\frac{1}{2}$ . 17.  $2\frac{1}{2}$ . 18.  $2\frac{1}{2}$ . 19.  $2\frac{1}{2}$ . 20.  $\frac{1}{2}$ . 21.  $4\frac{1}{2}$ . 22.  $5\frac{1}{2}$ . 23.  $3\frac{1}{2}$ . 24.  $2\frac{1}{2}$ . 25.  $3\frac{1}{2}$  mi. 26.  $\$7\frac{1}{2}$ . 27.  $9\frac{1}{2}$  lb. 28.  $932\frac{1}{2}$  lb. 29.  $\$1\frac{1}{5}$ . 30.  $3\frac{1}{2}$  gal. 31.  $6\frac{1}{2}$  A. 32.  $6\frac{1}{2}$  lb.

**Exercise 28.** — 1. 9. 2.  $12\frac{1}{2}$ . 3.  $10\frac{1}{2}$ . 4. 12. 5.  $9\frac{1}{2}$ . 6. 27. 7.  $11\frac{1}{2}$ . 8.  $21\frac{1}{2}$ . 9.  $8\frac{1}{2}$ . 10.  $41\frac{1}{2}$ . 11.  $12\frac{1}{2}$ . 12.  $78\frac{1}{2}$ . 13.  $116\frac{1}{2}$ . 14.  $89\frac{1}{2}$ . 15.  $13\frac{1}{2}$ . 16.  $6\frac{1}{2}$ . 17.  $28\frac{1}{2}$ . 18.  $35\frac{1}{2}$ . 19.  $21\frac{1}{2}$ . 20.  $11\frac{1}{2}$ . 21.  $22\frac{1}{2}$ . 22.  $68\frac{1}{2}$ . 23.  $29\frac{1}{2}$ . 24. 92.

**Exercise 29.** — 1.  $\frac{1}{2}$ . 2.  $\frac{1}{2}$ . 3.  $\frac{1}{2}$ . 4.  $\frac{1}{10}$ . 5.  $\frac{2}{15}$ . 6.  $\frac{7}{12}$ . 7.  $\frac{1}{12}$ . 8.  $\frac{1}{2}$ . 9.  $\frac{1}{2}$ . 10.  $\frac{1}{2}$ . 11.  $\frac{1}{2}$ . 12.  $\frac{1}{2}$ . 13.  $\frac{1}{2}$ . 14.  $\frac{1}{2}$ . 15.  $\frac{1}{2}$ . 16.  $\frac{1}{2}$ . 17.  $\frac{1}{2}$ . 18.  $\frac{1}{2}$ . 19.  $\frac{1}{2}$ . 20.  $\frac{1}{2}$ . 21.  $\frac{1}{2}$ .

**Exercise 30.** — 1.  $1\frac{1}{2}$ . 2.  $3\frac{1}{2}$ . 3.  $6\frac{1}{2}$ . 4.  $12\frac{1}{2}$ . 5. 6. 6.  $2\frac{1}{2}$ . 7. 6. 8.  $1\frac{1}{2}$ . 9.  $30\frac{1}{2}$ . 10.  $2\frac{1}{2}$ . 11.  $2\frac{1}{2}$ . 12.  $2\frac{1}{2}$ . 13.  $1\frac{1}{2}$ . 14.  $7\frac{1}{2}$ . 15.  $5\frac{1}{2}$ .

**Exercise 32.** — 1.  $1\frac{1}{2}$ . 2.  $\frac{1}{2}$ . 3.  $\frac{1}{2}$ . 4.  $2\frac{1}{2}$ . 5.  $1\frac{1}{2}$ . 6.  $\frac{1}{2}$ . 7.  $\frac{1}{2}$ . 8.  $\frac{1}{2}$ . 9.  $\frac{1}{2}$ . 10.  $\frac{1}{2}$ . 11.  $\frac{1}{2}$ . 12.  $\frac{1}{2}$ . 13.  $\frac{1}{2}$ . 14.  $\frac{1}{2}$ . 15.  $\frac{1}{2}$ .

**Exercise 33.** — 1. 9. 2. 12. 3. 10. 4.  $1\frac{1}{2}$ . 5.  $1\frac{1}{2}$ . 6.  $3\frac{1}{2}$ . 7.  $4\frac{1}{2}$ . 8.  $2\frac{1}{2}$ . 9.  $6\frac{1}{2}$ . 10.  $5\frac{1}{2}$ . 11.  $1\frac{1}{2}$ . 12.  $1\frac{1}{2}$ . 13. 2. 14. 5. 15.  $2\frac{1}{2}$ . 16.  $5\frac{1}{2}$ . 17.  $3\frac{1}{2}$ . 18.  $19\frac{1}{2}$ .

**Exercise 34.** — 1.  $17\frac{1}{2}$ . 2.  $3\frac{1}{10}$ . 3.  $6\frac{1}{2}$ . 4.  $5\frac{1}{2}$ . 5.  $6\frac{1}{10}$ . 6.  $7\frac{1}{2}$ . 7.  $7\frac{1}{2}$ . 8.  $8\frac{1}{2}$ . 9.  $8\frac{1}{2}$ . 10.  $5\frac{1}{2}$ . 11.  $3\frac{1}{2}$ . 12.  $7\frac{1}{2}$ .

**Exercise 35.** — 1.  $\frac{1}{2}$ . 2.  $1\frac{1}{2}$ . 3.  $3\frac{1}{2}$ . 4.  $\$6\frac{1}{2}$ . 5.  $\$21\frac{1}{2}$ . 6. 27 cents. 7.  $\$3.97\frac{1}{2}$ . 8. 48 $\frac{1}{2}$  cents. 9.  $\$2.92\frac{1}{2}$ . 10.  $\$1.06\frac{1}{2}$ . 11. 84 cents. 12.  $\$140.25$ . 13.  $\frac{1}{2}$ . 14.  $\frac{1}{2}$ . 15.  $\frac{1}{2}$ . 16.  $13\frac{1}{2}$  A. 17.  $38\frac{1}{2}$  cents. 18.  $4\frac{1}{2}$

cents. 19. 7 razors. 20. 5 stoves. 21. 9 hats. 22. 13 pairs. 23. \$24.75. 24. 40 da. 25. 32 da. 26. 8 bu. 27. 1 $\frac{1}{2}$ . 28. 10. 29. 3 $\frac{1}{2}$ .

## DECIMALS

**Exercise 42.**—1. 302.58. 2. 277.68. 3. 324.91. 4. 363.29. 5. 263.639. 6. 243.017. 7. 312.896. 8. 391.282. 9. 390.335. 10. 507.553. 11. 315.24. 12. 205.59. 13. 419.26. 14. 328.89. 15. 402.48. 16. 469.143. 17. 319.646. 18. 301.896.

**Exercise 43.**—1. 34.59. 2. 59.48. 3. 13.96. 4. 79.49. 5. 68.86. 6. 68.55. 7. 10.96. 8. 60.09. 9. 4.993. 10. 20.046. 11. 6.01. 12. 3.988. 13. 1.239. 14. 62.685. 15. 58.987. 16. 7.232. 17. 82.911. 18. 77.052. 19. 19.852. 20. 28.26. 21. 9.999. 22. 56.948. 23. 4.484. 24. 5.499. 25. 1.873. 26. 4.925. 27. 2.898. 28. 7.088. 29. 3.077. 30. 8.589.

**Exercise 45.**—1. 1.82. 2. 2.4. 3. 2.04. 4. 3.42. 5. 4.08. 6. 9.75. 7. 117.50. 8. 114.24. 9. 114.24. 10. 12.060. 11. 12.390. 12. .7152. 13. 1.7712. 14. 2.0952. 15. 2.0356. 16. 6.754. 17. 26.368. 18. 18.396. 19. 44.88. 20. 61.656. 21. 77.568. 22. 195.408. 23. 18.65. 24. 6.495.

**Exercise 48.**—1. 3.43. 2. 5.12. 3. 5.76. 4. .686. 5. .576. 6. .475. 7. 1.176. 8. 6.48. 9. 5.12. 10. 5.67. 11. 1.552. 12. 2.597. 13. 2.052. 14. 7.92. 15. 24.6. 16. 16.25. 17. 70. 18. 20.75. 19. 1.472. 20. 1.725. 21. 26.64. 22. 3.807. 23. .2772. 24. .3888. 25. .1424. 26. 52.92. 27. 1.232. 28. 11.4375. 29. 99.444+. 30. 4.333+.

## MEASUREMENTS

**Exercise 52.**—14. 2.1401+ mi. 15. 1.464+ mi. 16. 2.731+ mi.

**Exercise 53.**—5. 600 A. 6. 34 A. 7. 12.5 A. 8. 640 A. 9. 90 A. 10. 200 A., 360 A. 11. 3,680 sq. yd., 3,025 sq. yd., 4,235 sq. yd. 12. 9 sq. in., 27 sq. in.

**Exercise 54.**—3. 6 cu. ft. 4. 7.48 gal. 5. 1.244 cu. ft. 6. 67.2 cu. in. 7. 57.75 cu. in. 16. 1066 $\frac{1}{2}$ . 17. 702, \$421.20.

**Exercise 56.**—10. \$9.75. 11. 38 $\frac{1}{2}$  bu. 12. 62 $\frac{1}{2}$  bu. 13. \$57.75. 14. 60 cents. 15. \$1.125. 16. 80 cents.

## PERCENTAGE AND INTEREST

**Exercise 62.**—11. \$480. 12. 162 A.,  $\frac{1}{2}$ . 13. Widow's share \$2,375, son's share \$1,425, daughter's share \$2,850. 14. \$33. 15. \$540. 16. 3,540.

**Exercise 63.**—1. \$25. 2. \$30. 3. \$72. 4. \$59.50. 5. \$18.40. 6. \$39.20. 7. \$19.25. 8. \$26.70. 1. \$8.60. 2. \$10. 3. \$11.20. 4. \$18.90. 5. \$14.51. 6. \$11.66+. 7. \$817.50. 8. \$870. 9. \$754.40. 10. \$874.30.

# CHANCELLOR'S GRADED CITY SPELLERS

---

**CHANCELLOR'S GRADED CITY SPELLERS** constitute the first attempt to provide spelling lessons by grades, from the time that the spelling book is first placed in the hands of the pupil until the completion of the grammar school course.

**CHANCELLOR'S GRADED CITY SPELLERS** are published in two different forms, bound in full cloth, one series being in seven books, a book for each year from the second to the eighth year of the elementary school course; while the other series consists of two books, the first volume grouping together the work of the second, third, and fourth years, and the second volume embracing the work of the fifth, sixth, seventh, and eighth years.

The general plan of the series includes a review of drill words from the lessons of the preceding year, daily advance lessons, the use of all important words in suitable sentences, frequent reappearance in the sentences of the difficult words, syllabication of all spelling words, and systematic reviews at regular intervals.

The words to be learned are presented in three different ways:

- (a) **Alone**, not syllabicated, for recognition as they ordinarily appear.
- (b) **Combined** with other words in sentences, thus revealing the significance of the new words.
- (c) **Syllabicated**, for the analysis of the literal elements.

The series is rich in all the ordinary forms of word study. *Prefixes* and *suffixes* are treated with clearness and completeness. *Synonyms*, *homonyms*, and *antonyms* are matters of exercise at frequent intervals, and the various forms of *word-building* based upon the relation of *stems* and *roots* are presented with a fullness not surpassed in any other spelling series.

---

THE MACMILLAN COMPANY

64-66 FIFTH AVENUE, NEW YORK

BOSTON

CHICAGO

ATLANTA

SAN FRANCISCO

# CHANCELLOR'S GRADED CITY SPELLERS

Year by Year Edition	7 Books	Each, 12mo	Cloth
Second Year Grade . . . . .	54 pages.	15 cents <i>net</i>	
Third Year Grade . . . . .	52 pages.	15 cents <i>net</i>	
Fourth Year Grade . . . . .	68 pages.	15 cents <i>net</i>	
Fifth Year Grade . . . . .	64 pages.	15 cents <i>net</i>	
Sixth Year Grade . . . . .	68 pages.	18 cents <i>net</i>	
Seventh Year Grade . . . . .	80 pages.	18 cents <i>net</i>	
Eighth Year Grade . . . . .	89 pages.	18 cents <i>net</i>	

Two Book Edition	Each, 12mo	Cloth
Book One—Second, Third, and Fourth Year Grades, 166 pages.		25 cents <i>net</i>
Book Two—Fifth, Sixth, Seventh, and Eighth Year Grades, 299 pages.		30 cents <i>net</i>

Paper Cover Edition	10 Books	Each, 12mo
Second Year Grade, Part I . . . . .	30 pages.	6 cents <i>net</i>
Second Year Grade, Part II . . . . .	28 pages.	6 cents <i>net</i>
Third Year Grade, Part I . . . . .	28 pages.	6 cents <i>net</i>
Third Year Grade, Part II . . . . .	28 pages.	6 cents <i>net</i>
Fourth Year Grade, Part I . . . . .	36 pages.	8 cents <i>net</i>
Fourth Year Grade, Part II . . . . .	36 pages.	8 cents <i>net</i>
Fifth Year Grade, Complete . . . . .	64 pages.	12 cents <i>net</i>
Sixth Year Grade, Complete . . . . .	68 pages.	12 cents <i>net</i>
Seventh Year Grade, Complete . . . . .	80 pages.	12 cents <i>net</i>
Eighth Year Grade, Complete . . . . .	89 pages.	12 cents <i>net</i>

THE MACMILLAN COMPANY

64-66 FIFTH AVENUE, NEW YORK

BOSTON

CHICAGO

ATLANTA

SAN FRANCISCO





YB 35866

QA103

H72

v.1

Edic. Dept.

541421

UNIVERSITY OF CALIFORNIA LIBRARY

